SEPT 1982

HSR-236-0119-679

THEMATIC MAPPER

Prepared for
GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland 20771
CONTRACT NAS 5-24200

FLIGHT MODEL
PRESHIPMENT REVIEW
DATA PACKAGE
VOLUME II - SUBSYSTEM DATA
PART B

Article IV - 3A

HUGHES
HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP

HS 236-0019-1679

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Hughes Ref No. D4696

THEMATIC MAPPER

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VOLUME II

SUBSYSTEMS

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THEMATIC MAPPER

FLIGHT MODEL

PRE SHIPMENT REVIEW

VOLUME II

SUBSYSTEMS

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(Continued...)

2.0 Subsystems Acceptance Data

Each of the major subsystems of the Flight Model Thematic Mapper was reviewed as an entity prior to integration into the system. The intent of this section is to present for each major subsystem, acceptance data for the subsystem (test results); reference lists of the configuration status; and reference lists of Non-Conforming Material Reports, Failure Reports (with copies), and Requests for Deviation/Waiver (with copies).

The acceptance data for each subsystem (where applicable) is contained in the Appendix to this report, as referenced in the first subsection for each subsystem.

The second subsection for each subsystem contains a tabular summary of the "as designed" and "as built" configuration lists, showing all applicable drawings, specifications, or standards. (An "as built" configuration list for the total system is included in Volume I and is also included herein immediately following this page). This is followed by a listing of all items against the subsystem, with copies of NCRM's, RT's, and RD/W's.

SUMMARY

AS-BUILT CONFIGURATION LIST

TM FLIGHT S/N 003

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
1	51065	THEMATIC MAPPER ASSY	J	J	J	003
			4257A	4257A	4257A	
			4487A	4487A	4487A	
			4557A	4557A	4557A	
			4573A	4573A	4573A	
			4643A	4643A	4643A	
			4658A	4658A	4658A	
			D143R1	D143R1	D143R1	
			D144	D144	D144	
			D146	D146	D146	
			D148	D148	D148	
			D155	D155	D155	
			D158	D158	D158	
			D161	D161	D161	
			D162	D162	D162	
			D163	D163	D163	
			D164	D164	D164	
			D165	D165	D165	
			W166	W166	W166	
			W169	W169	W169	
			W170	W170	W170	
			W171R1	W171R1	W171R1	
			W173	W173	W173	
2	50840	MAIN FRAME ASSY	E	E	E	003
2	52347	ELECTRONICS MODULE ASSY	D	B	B	201
			4588A	4091A	4091A	
				4113A	4113A	
				4242A	4242A	
				4293A	4293A	

D L	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERI NUMB
3	3533003-100	MULTIPLEXER ASSY	C 43009 43074 65661 65662 W124 W125	C 43074 65661 65662 W124 W125	C 43009 43074 65661 65662 W124 W125	003
3	50869	POWER SUPPLY ASSY	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	D 2015A 2039A 4347A D030 D068 W074 W092 W093 W101	004
3	52348	CABLE ROUTING ASSY	F 3844A	F 3844A	F 3844A	005
2	52532	OPTICAL ASSY	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	F 3174A 4100A 4187A 4266A 4488A 4559A 4656A D-151 D-154 W-148	003
3	51512	AFT OPTICS ASSY	E 3646A 3925A 3959A 4585A	D 3646A 3896A 3925A 3959A 4134A	D 3646A 3896A 3925A 3959A 4134A	003

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
4	50795	PRIME FOCAL PLANE ASSY	J	H	H	201
			W126	3934A	3934A	
				3968A	3968A	
				3982A	3982A	
				W126	W126	
3	51200	RADIATIVE COOLER ASSY	E	E	E	003
			3922A	3922A	3922A	
			4201A	4201A	4201A	
			4216A	4216A	4216A	
			4269A	4269A	4269A	
			SB-W032	SB-W032	SB-W032	
			W144	W144	W144	
			W147	W147	W147	
			W149	W149	W149	
			W151	W151	W151	
4	50973	COLD FOCAL PLANE ASSY	B	B	B	201
			2870A	2870A	2870A	
			3895A	3895A	3895A	
			4173A	4173A	4173A	
			SB-D004	SB-D004	SB-D004	
			W102R1	W102R1	W102R1	
			W109	W109	W109	
			W111	W111	W111	
			W134	W134	W134	
			W135	W135	W135	
3	51337	TELESCOPE ASSY	D	D	D	002
			3866A	3866A	3866A	
			3917A	3917A	3917A	
			W129	W129	W129	
			W136	W136	W136	

D VL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	52534	RELAY OPTICS ASSY	D 1145A 4097A	D 1145A 4097A	D 1145A 4097A	003
	3533002-100	SCAN MIRROR ASSY	E	D 13121 13122 64358 64363 64369 64374 W020	D 13121 13122 64358 64363 64369 64374 W020	004

SECTION 2.6
FOCAL PLANE ASSEMBLIES

Section 2.6.1

Focal Plane Assemblies

Performance Data

The acceptance performance (test) data for the Focal Plane Assemblies is contained in Appendix D of this report (Vol. IV, Part D).

2.6.2
Acceptance Data

2.6.2.1
Configuration Lists

The "as built" configuration list for the Cooled and Prime Focal Plane Assemblies are included in the listing for the overall system.

AS-BUILT CONFIGURATION LIST

COLD FOCAL PLANE ASSY

P/N 50973, S/N 201, FLIGHT

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
1	50973	COLD FOCAL PLANE/COOLER CABLE ASSY	B + 2870A 3895A SB-D004 W-102R1 W-109 W-111* W-134 W-135 4173A	B + 2870A 3895A SB-D004 W-102R1 W-109 W-111* W-134 W-135 4173A	B + 2870A 3895A SB-D004 W-102R1 W-109 W-111* W-134 W-135 4173A	201
2	50955	COOLED FOCAL PLANE/COLD-FINGER ASSY	E + 2444A 3121A	E + 2444A 3121A	E + 2444A 3121A	201
3	50956	SUBSTRATE, COLD FOCAL PLANE	D + W-142	C + W-142	D + W-142	013
3	50958	DETECTOR ARRAY, BANDS 5 & 7	B + W-122* W-128* W-132 W-133	B + W-122* W-128* W-132 W-133	B + W-122* W-128* W-132 W-133	088 112
3	50959	DETECTOR ARRAY, BAND 6	B	B	B	120
3	50968	PRINTED WIRING BOARD, DISTRIBUTION	B	A + 6895 8161	A + 6895 8161	201
	50970	FLEXIBLE PRINTED WIRING ASSY, COOLER CABLE BAND 5	C	B + 9015 9645 2198A	B + 9015 9645 2198A	102
	50974	FLEXIBLE PRINTED WIRING ASSY, COOLER CABLE BAND 6	D	C + 9647 2199A	C + 9647 2199A	103
	50992	FLEXIBLE PRINTED WIRING ASSY, COOLER CABLE BAND 7	C	B + 9646 2200A	B + 9646 2200A	201

* Indicates waiver is active but no longer applicable to the hardware presently being used on this unit.

D L	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	51393	FLEXIBLE PRINTED WIRING ASSY, CABLE HEATER & SENSOR	C + 3941A	B + 9648 2201A 3941A	B + 9648 2201A 3941A	103
	51750	CLAMP, CABLE, INNER-HEATER & SENSOR	B	B	B	
	51751	CLAMP, CABLE, MIDDLE-HEATER & SENSOR	B	B	B	
	51752	CLAMP, CABLE, INNER-BAND 5&7	B	B	B	
	51753	CLAMP, CABLE, MIDDLE AND OUTER-BANDS 5 & 7	B	B	B	
	51754	CLAMP, CABLE, INNER-BAND 6	B	B	B	
	51755	CLAMP, CABLE, MIDDLE AND OUTER-BAND 6	B	B	B	
	51766	CLAMP, CABLE, OUTER-HEATER & SENSOR	B	A	B	

T. L. Dicks
Quality Assurance

3/10/82
Configuration Management Office

AS-BUILT CONFIGURATION LIST

PRIME FOCAL PLANE ASSY
P/N 50795, S/N 201, FLIGHT

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
1	50795	SILICON FOCAL PLANE ASSY	H + 3934A 3968A 3982A W-126	H + 3934A 3968A 3982A W-126	H + 3934A 3968A 3982A W-126	201
2	50797	SILICON DETECTOR & PREAMP ASSY-BAND 2	E + W115	E + W115	E + W115	401
2	50797	SILICON DETECTOR & PREAMP ASSY-BAND 3	E + W112 W116	E + W112 W116	E + W112 W116	401
2	50797-1	SILICON DETECTOR & PREAMP ASSY-BAND 1	E + W123	E + W123	E + W123	401
2	50797-1	SILICON DETECTOR & PREAMP ASSY-BAND 4	E + W114 W117 W118	E + W114 W117 W118	E + W114 W117 W118	401
3	51015	SILICON PREAMP ASSY	D + 2950A	D + 2950A	D + 2950A	103 203 207 209
3	51015-1	SILICON PREAMP ASSY	D + 2950A (S/N 207-1) W119	D + 2950A W119	D + 2950A W119	102-1 206-1 207-1 208-1
4	50799-1	SUBSTRATE ASSY, SILICON PREAMP FIRST STAGE	C	C	C	018 027 035 043
4	50799-2	SUBSTRATE ASSY, SILICON PREAMP FIRST STAGE	C	C	C	010 016 030 024

PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
50807	LED SOURCE, SILICON FOCAL PLANE ASSY	H + D027	H + D027	H + D027	201

S. H. Branda 12-18-81
Quality Assurance

E. Devera 12-18-81
Configuration Data Management Office

PRIME FOCAL PLANE ASSEMBLY

Listing of Liens

FOCAL PLANE ASSEMBLIES
PRIME FOCAL PLANE ASSEMBLIES
P/N 50795

Failure Reports Number	
Open	Closed
	F0527
	F0560
	F0581
	F0620
	F1717
	F2240
	F2241
	F2662
	F2663
	F2666
	F2668
	F2669
	S8014
	S8058
	S8201
	S8202
	S8206(Spare)
	S8211(Spare)
	S8212(Spare)
	S8227
	S8228(Spare)
	S8229
	S8231(Spare)
	S8317
	S8318
	S8322
	S8323
	S8324
	S8330
	S8341
	S8342
	S8401(Spare)
	S8440

Deviations	Waivers
D-128	W-112
D-142	W-114
	W-115
	W-116
	W-117
	W-119
	W-120
	W-126
	W-143
	W-148
	W-154
	W-155
	W-157
	W-158

PRIME FOCAL PLANE ASSY.

P/N 50795

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.			ENGINEER Failure Report No.	
Open	Closed	Open	Closed		Open	Closed
	F0527		F0561	S8016		F1766
	F0560		F0569	S8017		F2697
	F0581		F0570	S8019		
	F0620		F0596	S8020		
	F1717		F0609	S8039		
	F2240		F0611	S8040		
	F2241		F0612	S8041		
	F2262		F0613	S8053		
	F2263		F1702	S8054		
	F2666		F1706	S8055		
	F2668		F1721	S8056		
	F2669		F1723	S8059		
	S8014		F1724	S8060		
	S8058		F1752	S8062		
	S8201		F1768	S8063		
	S8202		F1771	S8065		
	S8206(Spare)		F1784	S8066		
	S8211(Spare)		F1785	S8067		
	S8212(Spare)		F1786	S8070		
	S8227		F1790	S8071		
	S8228(Spare)		F1795	S8072		
	S8229		F1798	S8077		
	S8231(Spare)		F1799	S8078		
	S8317		F1800	S8079		
	S8318		F2388			
	S8322		F2389			
	S8323		F2390			
	S8324		F2648			
	S8330		F2673			
	S8341		F2674			
	S8342		F2712			
	S8401(Spare)		F2796			
	S8440		S8000			
			S8001			
			S8002			
			S8003			
			S8004			

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 052

1. PROGRAM NAME AND NUMBER: TRANSIT MAPPER | 2. CLA: V011 | 3. MODEL: ALL | 4. TIME OBSERVED: 9999HE | 5. DATE OBSERVED: MO 8 DA 2 Y 7

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☒ PART

ORIGINATION

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	RADIOMETER			
8. UNIT	PRIME FOCAL PLANE	50795		
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER	SILICON PHOTODIODE DETECTOR	50803	ALL	HAC DIV

12. TEST WHEN FAILURE WAS OBSERVED: ☒ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ ASCENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ MIN. AT ____ ° ____ ☐ ELEC/PWR ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: High Resistive Backside Contact At Interface Between Silicon Detector & Quartz Substrate

ENGINEERING EVALUATION

15. TEST PROCEDURE | PARA | 16. ORIGINATOR: J. Conrad | ORG 2221-01 | DATE 5-8-79 | ☐ CONTINUATION SHEET

17. VERIFICATION AND FAILURE ANALYSIS: Hi resistance determined by HAC Div Sc to be due to oxide growth on backside of detector. See attached IDC Memorandum to E.L. Kern dated July 27, 1979.

18. PART(S) ITEM(S) NAME AND PART NUMBER

19. ☐ FOLLOWING ENGINEERING/TEST REQUIRED ☐ PROGRAM/TEST NOT RECOMMENDED BECAUSE: New detectors will be fabricated for parts/flig

21. AUTHORIZATION | ORG | DATE | ☐ CONTINUATION SHEET

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: See attached IDC E 1310a dated 2 May 1979

22. QA ACTION

23. CA ACTION

23. LIST ALL PARTS REPLACED

PART NUMBER	CRT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Oxide growth on bare silicon caused Hi Resistive Contact. New Detectors will be fabricated with a Chrome/Gold Backside Metalization and the detectors will be mounted to the Chrome/Gold Metalized Quartz Substrates using Wakmen 3022 Conductive Epoxy (SMB0140) applied per SPB0141.

32. FRB CLOSURE: HUGHES S&C FAILURE REVIEW BOARD — Failure Report Closed — Date 10-5-79

☐ CONTINUATION SHEET

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/R&B ERROR ☐ WORKMANSHIP ☐ HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J. Conrad | ORG 2821 | DATE 10-15-79

38. SPACECRAFT SYSTEM ENGR.: J. Conrad | ORG 2821 | DATE 10/19

39. RELIABILITY: [illegible] | ORG 5821 | DATE 10-19-79

40. CUSTOMER OR SUPPLIER: [illegible] | DATE 10/19

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HUGHES

HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F .056

1. PROGRAM NAME AND NUMBER: TM HS 236 | 2. GLA | 3. MODEL: PLT | 4. ITEM OBSERVED | 5. DATE OBSERVED: MO 11 DA 12

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

ORIGINATOR

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Silicon Preamp Assy.	51015	203	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☒ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ DISCRPI ☐ VIBRATION ____ AXIS PGR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Ch 1 and 7 were pegged at -25V. Ch's 2,3,5 & 8 exceed wideband noise spec.

15. TEST PROCEDURE: 16306 PARA 4.7 | 16. ORIGINATOR: Joe Kleckner | ORG 3213 | DATE 11/13/81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No components were mentioned.

19. FAILED ITEM'S NAME AND PART NUMBER: Varistor 52599

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace FETs in circuit per 16306 para 4.7

21. AUTHORIZED BY: [signature] | ORG 2122 | DATE 11/16/81 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: FETs removed and replaced per 16306 para 4.7

23A. QA RECORD: 19

23B. QA RECORD: 5

24. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
52599						

25. REWORK BY: ORG DATE | 26. RETESTED BY: [signature] ORG 21-22 DATE 11/16/81 | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

27. CAUSE AND CORRECTIVE ACTION: FETs were noticed prior to start of test. FR should not have been written since Reason for failure against FET failure on first test

28. FRB CLOSURE: [signature] 5/18

29. ☐ CONTINUATION SHEET USED

30. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

31. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP. ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECT CODE ☒ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT

32. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 33. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

34. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 11/24/81 | 35. SPACECRAFT SYSTEM ENGR.: [signature] ORG 2261

36. RELIABILITY: [signature] ORG 51-44 DATE 11-18-81 | 37. CUSTOMER OR SUPPLIER: [signature] 5/18/81

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FAILURE REPORT

F .0581

HS 236

ORIGINATOR

1. PROGRAM NAME AND NUMBER: THEMATIC MAPPER | 2. GLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 1400 | 5. DATE OBSERVED: MO SEPT DA 21 YR 1979

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT			FLIGHT	
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	POSITION INDICATOR PICKOFF ASSEMBLY	52083	201 - 207	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ . ☐ ELECTRIC ☐ VIBRATION ____ AXIS PSD ____ GRMS TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: THE PICKOFF ASSEMBLY IS A FIXTURE MADE UP OF A LIGHT EMITTING DIODE AND A PHOTOTRANSISTOR, BETWEEN WHICH A SHUTTER FLAG MAY PASS. AS PER TEST PROCEDURE 16660 PARA 3.5.2 WITH 25% RATED L.E.D. CURRENT, PHOTOTRANSISTOR IRRADIANCE WAS INSUFFICIENT FOR TURN-ON IN SPECIFIED CIRCUI

15. TEST PROCEDURE: 16660 | PARA: 3.5.2 | 16. ORIGINATOR: J. A. BANACH | ORG: 22-13 | DATE: NOV 7 1979 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: LED current used for test to low. Based upon pol. reviews of part application, test current could be increased to 50% rated LED current and still with confidence that operation over life would be assured with worst case degrading.

19. FAILED ITEM NOMENCLATURE AND PART NUMBER

20. ☒ FOR FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Retest using 50% rated LED current

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Test procedure changed to test with 50% rated LED current | 24. QA REVIEW | 25. QA ATTEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CRT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause - Insufficient LED drive current.
Corrective action - Test procedure changed to increase LED drive current to 50% rated. See Revision B of Spec 16660

31. ☐ CONTINUATION SHEET USED | 32. FRB CLOSURE: 5/29/80

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: ECR 1237/01 to Rev B of 16660.

34. BASIC CAUSE OR VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP. ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☒ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ UNKNOWN ☐ INDUCED ☒ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J A Banach | ORG: 22-13 | DATE: 1/21/80

38. SPACECRAFT SYSTEM ENGR. | ORG: 2261 | DATE: 810528

DATE

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FAILURE REPORT

F .062(

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM HS236 | 2. CLA | 3. MODEL: FLT | 4. TIME OBSERVED | 5. DATE OBSERVED: MO 9 DA 18 YR 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Silica Freons Assy.			
8. UNIT	Pump, Fuel Flow Accum	51015-1	201	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☒ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS. AT ___ ° ___ ☐ ENCAP ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: Channel 1 does not meet transient response spec. and channel 4 does not meet transient sp

15. TEST PROCEDURE: 16306 PARA 4.6 | 16. ORIGINATOR: Joe Kleeburn ORG 2215 DATE 8/5/80 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: SHIELD ADJUSTMENT DOES NOT AFFECT PASS STRESSES. RELIEF VALVES WERE WITHIN SELECT RANGE SPECIFIED. NORMAL POWER WAS APPLIED. NO OVERSTRESS WAS POSSIBLE.

18. FAILED ITEM NAME AND PART NUMBER

23. ☐ FOLLOWING REPAIR/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Adjust nozzle shields on channels 1 & 4 and retest per 16306 Para 4.6 after replacing feedback nozzles.

21. AUTHORIZATION: [signature] ORG 2215 DATE 8/23 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Adjust nozzle shields on channels 1 & 4 and retest per 16306 Para 4.6 after replacing feedback nozzles

24. QA REVIEW

25. QA RETEST

23. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ___ ORG ___ DATE ___ | 28. RETESTED BY ___ ORG ___ DATE ___ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Nozzle shields not adjusted correctly. Nozzles not able to be brought in spec with shield adjustments. Operator instructed to make sure proper adjustments are made before final testing.

31. FRB CLOSURE

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2123 DATE 9-17-80

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 22-61 DATE 10/21/80

39. RELIABILITY: [signature] ORG 5740 DATE 10-21-80

40. CUSTOMER OR SUPPLIER: G.E. DATE 10/21/80

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FAILURE REPORT

F 1717

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM HS 236 | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED: 3:14 PM | 5. DATE OBSERVED: AUG 4 '88

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	Silicon [illegible] Assembly			MMK
8. UNIT	HALF-BAND		103	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY		50155-1	104	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☒ EVALUATION

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ MTR. AT ___ ° ___ . ☐ EMC/EPI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: Requirements of paragraph 4.6 (Frequency Response) and paragraph 4.7 (Wideband noise) are out of tolerance in 8 places.

15. TEST PROCEDURE: 16306 PARA 4.6,7 | 16. ORIGINATOR: N.C. DAVISON JE | ORG 2213 | DATE 8-5-88 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: The unit tested was mis-identified. It is really SN 103

18. FAILED ITEM NAME AND PART NUMBER

19. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Rework per supplement 4

21. AUTHORIZATION: [signature] ORG 2122 DATE 8/8/88 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Failure from S 0066 was ground against SN 103. Failure SN 103 was reworked and retested per supplement 4. No addition of any other components resulted.

24. R

25. R

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
50799						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Workmanship. Fix demonstrated using rework of Backtrace Assy. Failure was due to excessive stress in Quartz substrate. Design + Testing has challenged these substrates.

31. FRB CLOSURE: [signature] 8/12/88 | ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECT CODE ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☒ WORKMANSHIP ☐ WEAR-OUT

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 7-1-88

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 2261 DATE 8/10/88

39. REMARKS

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FAILURE REPORT

F 2

1. PROGRAM NAME AND NUMBER: TM HS 236 | 2. CLA | 3. MODEL 20 | 4. TIME OBSERVED | 5. DATE OBSERVED

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

ORIGINATOR

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFAC
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY	HALF BAND LEVEL ASSY	51015-1	102	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☒ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ° ☐ THERMAL VAC ___ HRS AT ___ ° ☐ EMC/EMI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNELS T&I WIDEBAND NOISE EXCEEDS LIMIT OF 2.4 PA IS: APPROX. 3.5 pA. *REF. ORIGINAL ER's 1798, 1 GENERATED FOR NHA. FULL BAND ASSY NO. 50797

15. TEST PROCEDURE: 16597 PARA 4.7 | 16. ORIGINATOR: J. Lee ORG SBRC DATE 3/6/81 | 17. CONT SHT

ENGINEERING EVALUATION

16. VERIFICATION AND FAILURE ANALYSIS:

18. FAILED ITEM NOMENCLATURE AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace FETs and retest per 16597 para 4.7 FET CH I REPLACED IN AHP SUPPLY - OTHER FETs REPLACED SUPPLY 6.

21. AUTHORIZATION: [signature] ORG 2122 DATE 3/6/81 | 22 CONT SHT

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: FETs replaced and tested good per 16597 para 4.7. No other components were overstressed.

24. [illegible]

25. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS
52597						

27. REWORK BY ___ ORG ___ DATE ___ | 28. RETESTED BY ___ ORG ___ DATE ___ | CONT SHT

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Workmanship. FETs damaged during disassembly of Band Level Assy. Band Level Assy redesigned so that it will not have to be disassembled. Operator cautioned to use more care.

33. FRB CLOSURE: [signature] 6/8

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ UNKNOWN ☒ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 6/4/81

38. SPACECRAFT SYSTEM ENGR.: [signature] ORG 2261 DATE 6/8/81

39. RELIABILITY: [signature] ORG 51-41 DATE 6-9-81

40. CUSTOMER OR SUPPLIER: [signature] DATE 6/10/81

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FAILURE REPORT

F 2241

1. PROGRAM NAME AND NUMBER: T.4 HS236 | 2. CLA | 3. MODEL | 4. TIME OBSERVED | 5. DATE OBSERVED

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☑ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

ORIGINATOR

COMPONENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☑ SUBASSEMBLY	HALF BAND LEVEL ASSY	50101S	203	SERC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☑ ATP PROC 822 ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ ASCENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ HRS. AT ___ ° ___ . ☐ ECC/RFI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNELS 12 & 8 WIDEBAND NOISE EXCEEDS LIMIT OF 2.4 pA.* REFERENCE ORIGINAL FR's 1793, 1771, 1786, 1799 GENERATED FOR N.H.A. FULL BAND ASSY. NO. 50797

15. TEST PROCEDURE: 16597 PARA 4.7 | 16. ORIGINATOR: Gary Lash | ORG: SERC | DATE: 2/6/81 | ☐ 17. CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☑ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace FETs and test per 16597 para 4.7. FETs were replaced by AHR Supp 4 which installed 4 new substrate with new FETs (attached BAN ass'y.

21. AUTHORIZATION: [signature] | ORG: 2122 | DATE: 6/24/81 | ☐ 22. CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Substrate replaced and tested per and per 16597 para 4.7. No other components were overstressed.

24. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
52597						

25. REWORK BY | ORG | DATE | 26. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

27. CAUSE AND CORRECTIVE ACTION: Workmanship. FETs damaged during disassembly of Band Level Assy. Vendor continued to use improper lead bend. Band level redesign is such it would not have to be taken apart for assembly.

28. FRB CLOSURE: [signature] 6/29

29. ☐ CONTINUATION SHEET USED

30. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

31. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☑ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

32. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

33. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

34. RESPONSIBLE ENGINEER: [signature] | ORG: 2122 | DATE: 6/24/81

35. SPACECRAFT SYSTEM ENGR: [signature] | ORG: 2261 | DATE: 8/26/81

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FAILURE REPORT

F 2662

ORIGINATOR

1. PROGRAM NAME AND NUMBER: T.M. | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED: 6:30 | 5. DATE OBSERVED: 2 19 1981

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	SiFPA HALF BAND	5101S-1	208-1	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ___ ° ___ ☐ THERMAL VAC ___ PRS. AT ___ ° ___ ☐ ESD/EMI ☐ VIBRATION ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 8 NOISE OUT OF SPEC. S/B 2.4 pA MAX OBSERVED VALUE IS 2.5 pA.

15. TEST PROCEDURE: 16306 PARA 4.7 | 16. ORIGINATOR: A. C. DAVISON ORG 2213 DATE | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

16. VERIFICATION AND FAILURE ANALYSIS: Failure occurred during test detents. No operator or any components involved. = FQ. HARDWARE WAS NOT INVOLVED.

18. FAILED ITEM NAME AND PART NUMBER

23. ☐ FOLLOWING RECORD/RETEST REQUIRED ☐ NO RECORD/RETEST NOT REQUIRED ESCALATE: Halfband noise increased while connected to a test detent in the case the test detent was contributing more than the past 10 good test detents.

21. AUTHORIZATION: [illegible] ORG 21 22 DATE 2/4/81 ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. RECORD/RETEST ACTION TAKEN: Halfband was within band loading 3SN 2L. The Halfband 208-1 CHAR corresponds to Bandpeak 0.69 GHz. The noise of Bandpeak 0.62 was measured and found to be 2.4 pA, well within the spec of 2.4 pA

23. QA ACCEPT: [illegible] 2-17

24. QA ACCEPT: [illegible] 2-17

25. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ORG DATE | 28. RETESTED BY ORG DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: The test detents should have been changed and the Halfband related Personnel have been instructed to do so in the future.

33. FRB CLOSURE: [signature] 11/17/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 11/14/81

38. SPACECRAFT SYSTEM ENGR. [signature] ORG 22 41 DATE 11/17/81

39. RELIABILITY [signature] ORG 51-41 DATE 11/17/81

40. CUSTOMER OR SUPPLIER 44 DATE 11/18/81

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FAILURE REPORT

F 266

1. PROGRAM NAME AND NUMBER: TM V011 | 2. SLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 1026 | 5. DATE OBSERVED: 03-18-8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

ORIGINATOR

IDENTIFICATION: NAME | PART NUMBER | REV | MANUFACTURER

7. SUBSYSTEM

8. UNIT

9. ☐ ASSEMBLY ☒ SUBASSEMBLY — 510154 — 209

10. ☐ MODULE ☐ MICAM ☐ CARD

11. OTHER

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ INSPECTION ☒ ACCEPTANCE ☐ SYSTEM

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ CECO/RPI ☐ VIBRATION ____ AXIS FOR ____ SEC TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 7 TRANSIENT RESPONSE IS 2% LUMPER ABOVE 30μs AND 1.75% LUMPER BELOW 60 μs

15. TEST PROCEDURE: 16306 PARA 4.6 | 16. ORIGINATOR: C R Tsao ORG 22-13 DATE 05-11-81 ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: Failure is in performance only; no component was subjected to excessive

18. FAILED ITEM NAME AND PART NUMBER: Hood Resistor 52595

19. ☒ FOLLOWING RETEST/RETEST REQUIRED ☐ RETEST NOT REQUIRED BECAUSE: Replace resistor Ch 7 & retest per 16306 para 4.6

21. AUTHORIZATION: [signature] ORG 31-22 DATE 5-14-81 ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. RETEST/RETEST ACTIONS TAKEN: Replaced resistor R-7 and retested successfully per 16306 para 4.6

23. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
52595						

24. REWORK BY: ____ ORG ____ DATE ____ | 25. RETEST BY: [signature] ORG 31-22 DATE 5-14-81 ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

26. CAUSE AND CORRECTIVE ACTION: Transient response changed after replacement of a composite shield. Transient produced in Lumper position of shunt and could not be brought into spec without shield. Known trouble that can be controlled with selection of resistor R7 to ground. DISTRIBUTED CAPACITANCE OF RESISTOR TO GROUND CHANGED WHEN CROSSTALK ☐ CONTINUATION SHEET USED

27. FRB CLOSURE: [signature] 5/18/81

28. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

29. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☒ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET UP ☐ MFG. PROCEDURE ☐ ASSY/R&B ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

30. FAILURE TYPE: ☒ PRIMARY ☐ SECONDARY ☐ UNKNOWN ☐ NO FAILURE | 31. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

32. RESPONSIBLE ENGINEER: [signature] ORG 31-22 DATE 5/15/81 | 33. SPACECRAFT SYSTEM ENGR: [signature] ORG 226 DATE 5/18/81

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EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

2663 FR SERIAL NO. | CONT. SHT LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FI CONTINUATION SHEET(S) USED

30	SHIELD WAS CHANGED OUT. CROSSTALK SHIELD IS A PART OF THE GROUND PLANE. THE NEW RESISTOR MATCHED THE ELEC CHARACTERISTICS OF THE CIRCUIT TO CORRECT TRANSIENT RESPONSE.

16060A SC AUG 78

Approved by (GSFC) 8-12-81

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FAILURE REPORT

F 2668

p.1 of 1

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 | 2. SLA | 3. MODEL: FLT | 4. TIME OBSERVED: 4:30A | 5. DATE OBSERVED: MO 5 DA 29 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ACCESSORY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	Board 4	50797	401	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☒ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ MEA. AT ____ ° ____ . ☐ ELEC/RFI ☐ VIBRATION ____ ARIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 16 FAILS TO RESPOND TO OPTICAL STIMULUS. LARGE AMOUNTS OF CROSSTALK OBSERVED ON CHANNELS 14 (35 mV ; .79 VRMS) & 15 (10 mV ; .18 VRMS) AT PREAMP OUTPUTS.

15. TEST PROCEDURE: 16597 PARA: N/A | 16. ORIGINATOR: N.C. DAVISON 2213 | ORG | DATE: 5-29-81 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

23. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Rework and retest per supplement #1

21. AUTHORIZATION: [signature] | ORG 2122 | DATE 5/29/81 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: Reworked and tested per supplement 1 successfully. No overstress caused to any components.

24. QA [signature] | 25. QA [signature]

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS
50803						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: Defective trace was damaged during assembly and/or rework resulting in an open signal circuit. Operator was cautioned to use more care.

33. PRU CLOSURE [signature] FOR L. OCHS 8/6/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/PAC ERROR ☐ ROUGH HANDLING ☐ DEFECT CODE ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☒ WORKMANSHIP ☐ WEAR-OUT

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2123 DATE 9/7/81 | 38. SPACECRAFT SYSTEM ENGR. [signature] ORG 2241 DATE 8/10/81

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FAILURE REPORT

F 26

ORIGINATOR

1. PROGRAM NAME AND NUMBER: T.M. | 2. GLA | 3. MODEL | 4. TIME OBSERVED: 2:30 | 5. DATE OBSERVED: MO 12 DA 2

6. HARDWARE LEVEL WHICH FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY		S1015-1	207-1	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ☐ THERMAL VAC ____ MEA AT ____ ° ☐ EMC/EMI ☐ VIBRATION ____ AXIS FOR ____ GRMS TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 3 TRANSIENT RESP. IS 125% @ 60μ Sec. S/B ≤ 80 @ 60μ Sec. RECOMMEND USE AS IS.

15. TEST: 16306 PARA 4.6 | 16. ORIGINATOR: N. G. DAVISON ORG 2223 DATE 12-81 | ☐ CONTIN SHEET

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS

18. FAILED ITEM NAME AND PART NUMBER

19. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Further work is not considered cost effective at this time.

21. AUTHORIZATION: [signature] ORG 2122 DATE 12/14/81 | ☐ CONTIN SHEET

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN | 24. QA REWO

25. QA RETE

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTIN SHEET

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: This changed many rework a number of times and this was to test transient response strength. It was decided to wear in better than subject the hardware to any further rework.

Waiver W-119 attached.

31. ☐ CONTINUATION SHEET USED

32. FRB CLOSURE: [signature] 12/17

33. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 12/14/81

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 2241 DATE 12/17

39. RELIABILITY: [signature] ORG 151-91 DATE 12-18-81

40. CUSTOMER OR SUPPLIER ____ DATE ____

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR SAE FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. SPECIFICATION FOR DEV. AP. ON/WAIVER

a. MOD/TYPE	b. SPEC. CODE	c. SPEC. BASIS	d. SPECIFICATION NO.
F	11323	TM	W-119

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. TEST SPECIFICATIONS AFFECTED/TEST PLAN

	SPEC. CODE	SPEC. DOC. NO.	REV.
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

SPEC. CODE	NUMBER	REV.	MOD. NO.
11323	51015	D	2950-A

9. TITLE OF DEV./WAIVER: Permission to use Halfband SN 207-1

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. SERIAL NO.:

14. DEFECT CLASSIFICATION: [ ] MINOR [X] MAJOR [ ] CRITICAL

15. NAME OF ITEM OR LOWEST ASSEMBLY AFFECTED: 51015

16. PART OR TYPE NO.:

17. LOT NO.: 207-1

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST: Greater than $100,00 if not approved

21. EFFECT ON DELIVERY SCHEDULE: Greater than 4 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Halfband SN 207-1 with transient response ringing to 1.75% by 60 nsec on channel 4 vs a specification of ±1.0% by 60 nsec.

24. REASON FOR DEVIATION/WAIVER

This unit had been rework a number of times and this was the best result. Halfband has since been assembled into Band 2 Band Level Assy. Rework at this time is not considered cost or schedule effective.

REA [signature] 11/16/81 SYS ENGR [signature] 11/17/81 QA [signature] 11-18-81 PE [signature] 11/18/81

25. EFFECTIVITY BY SERIAL NUMBER: 003

26. [signature] 11/18/81

27. Signature - System Engineering
Major/Critical - Program Manager

28. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

29. GOVERNMENT ACTIVITY: [signature] DATE 12-7-81

DD FORM 1694

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SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 801

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V011		FLIGHT	1:32 P.M.	MO 6 DA 13 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	(BAND 2)	50904	201	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: NO SIGNAL CH.'s 3, 4, 7, 8, 11, 12, 15, 16. // JUMPER FROM R98 TO U1-PIN18 INCORRECTLY CONNECTED TO U1-PIN42, ETC. FOR CHANNELS 4, 7, 8, 11, 12, 15 & 16. JUMPERS NOT TO PRINT.

15. TEST PROCEDURE: 16368 | PARA: 4.3.1 | 16. ORIGINATOR: A. C. DAVISON II | ORG: 2213 | DATE: 6-16-81 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: MISPLACED JUMPER WIRES (WORKMANSHIP ERROR). NO OVERSTRESS OCCURRED SEE AVD DATED 11/19/81. (ATTACHED)

19. FAILED ITEM NAME AND PART NUMBER: BAND 2 POSITION BD 50904-___ NO PARTS FAILED

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE

INSTALL JUMPER WIRES TO PRINT

21. AUTHORIZATION | ORG | DATE | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: JUMPER WIRES PROPERLY INSTALLED PER E.O. 9678 ATTACHED | 24. QA INSPECTION | 11-17-81

25. QA RETEST | 11-17-81

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM
NONE						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: WORKMANSHIP ERROR (JUMPER WIRES NOT INSTALLED TO PRINT). PERSONNEL READVISED TO BE CAREFUL WHEN INSTALLING JUMPER WIRES. Inspection supervisor notified of inspection error. Will review all effected E.O.'s prior to release. 11/19/81

*NOTE: EFFECTIVITY OF EO 9678 IS FIRST USE. AVD DATED 11/19/81 ATTACHED

31. FRO CLOSURE: 11/19/81

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: X EO 9678 DETAILS JUMPER WIRE INSTALLATION ATTACHED

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[illegible]	W/2	11/19/81	[illegible] for [illegible]	72-41	11/19/81
39. RELIABILITY: A. Huber	ORG: 51-11	DATE: 11-13-81	40. CUSTOMER OR SUPPLIER		DATE

D11873 SC JAN 80

11/24/81

SANTA BARBARA RESEARCH CENTER

AVOID VERBAL ORDERS

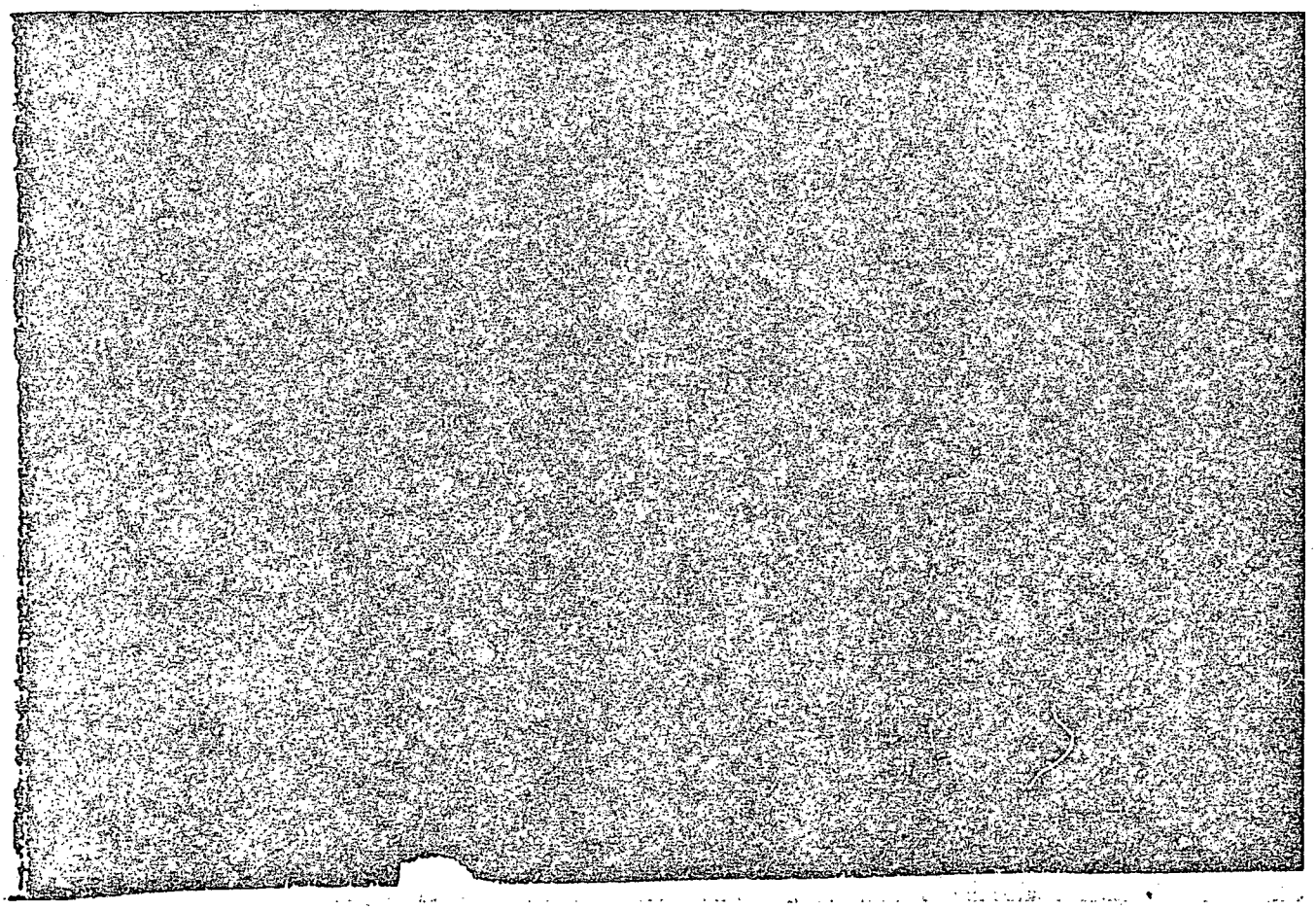
TO Lloyd O'Connell,Mgr. Reliability DATE November 19,1981

FROM Dee Evans, Reliability Engineer SUBJECT ER #8014

After carefully reviewing schematic in conjunction with subject failure #8014, I comfortably feel that no overstress has occurred to any components regarding subject failure.

Dee Evans,
Reliability Engineer

SBRC FORM 14-0312



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FAILURE REPORT

S 8058

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 | 2. GLA: | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 4:27 p.m. | 5. DATE OBSERVED: MO 12 DA 11 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY		S1015-1	102-1	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL NO. 1 OUTPUT PEGGED AT -25VDC ~~TRANSIENT RESPONSE > 1% ON CHANNELS 1 & 3~~

15. TEST PROCEDURE: 16306 | PARA: 46-4.7 | 16. ORIGINATOR: N.C. DAVISON | ORG: 2213 | DATE: 12-11-80 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: FET damaged during removal of Bond 1 SN 101. No overstress of any component occurred as a result.

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace FET per supplement 5.

21. AUTHORIZATION: [signature] | ORG: 2122 | DATE: 12/19/80 | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: FET replaced per supplement 5 and retested good per 16306

24. QA REVIEW: [signature]

25. QA RETEST: [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NO.
52597						

27. REWORK BY: | ORG: | DATE: | 28. RETESTED BY: | ORG: | DATE: | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ~~Failed FET~~ Failed S1015-1 SN 102 was due to [illegible] from Bond level assy Bond 1 SN 101 due to excessive stress in quality substitution. The FET on ckt 1 was damaged in the process and was replaced. The Bond level assy has been redesigned to use different assy tooling and adhesives so that this in quality substitution will be accepted.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION:

33. FRB CLOSURE: [signature]

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE:

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2122 | DATE: 6/16/81 | 38. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG: 9261 | DATE: 6/16/81

39. RELIABILITY: [signature] | ORG: 51-4 | DATE: 6-16-81 | 40. CUSTOMER OR SUPPLIER | DATE:

011873 SC JAN 80

PRE-AMP – MAIN AHR, OP. # 2600
POST-AMP – MAIN AHR, OP. # 1300

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FAILURE REPORT

S 8201

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V411 TM		FLIGHT	FIRST SHIFT	MO 11 DA 03 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	PRE-AMP BAND 1	30777	401	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 65 °F ☐ THERMAL VAC ____ HRS AT ____ °F ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH.S 2, 4, 6, 8 10, 12, 14, 16 NEAREST NEIGHBORS > -40dB, NON-NEIGHBORS AVERAGE > -60dB. SEE DATA SHEET

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16597	4.8	C. R. Lee	2213	11-03-81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Diagnostic testing revealed the ground plane on iron channel baseboard material (SN 16-1) was not connected to signal return. No continuity between the two points.

19. FAILED ITEM NAME AND PART NUMBER: Preamp Assy 51015-1

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Repair per MCO 277772

21. AUTHORITY	ORG	DATE	22. CONTINUATION SHEET USED
[signature]	2122	11/9/81	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Burn-in test accomplished per MCO 277772. All channels now meet limits requirements except for ch 2. Band 2 failure is addressed by FR 8140.

24. QA SIGNATURE: [signature]

25. [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause is unknown. Work to determine if a measure of screening test can be done at Hybrid level is underway.

CROSSTALK FOR CHANNEL 2 ACCEPTABLE PER W123 (COPY ATTACHED)

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W123 (COPY ATTACHED)

33. FRB CLOSURE: [signature] 12/18/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2122	11/20/81	[signature]	22-41	12/18/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	12-18-81	[signature]	

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRIT

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-123

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MFR. NO.
11323	50797	E	—

9. TITLE OF DEVIATION/WAIVER
Permission to use Band 1 Band Level Assy SN 401

10. CONTRACT NO. & LINE
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II
13. DEFECT NO:
14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRIT

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 1 Band Level Assy
16. PART NO. OR TYPE DESIG.: 50797-E
17. LOT NO.: 401
18. QTY: 1
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $100,00-if not approved.

21. EFFECT ON DELIVERY SCHEDULE
Six weeks

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

Band 1 has a number of channels with transient/frequency response discrepancies as defined by FR 8440. Attached is a copy of FR 8440 and transient response plots for all channels. Channel two has average crosstalk between non-neighbors of -59dB vs a specification of ≤-60dB.

24. NEED FOR DEVIATION/WAIVER

Band 1 has been bonded into the FPA assy and discrepancies are not considered sig enough to warrant rework on a cost/schedule impact basis.

REA D.M. Randall 11/20/81 SYS ENGR L.L. Conrad PE [illegible]
QA [illegible]
CMO [illegible] 3-8

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 51065 SERNC CC3 ONLY

26. [illegible] 11/23/81

Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL DISPOSITION

[ ] APPROVED RECOMMENDED [ ] DISAPPROVED

SIGNATURE [illegible] DATE 12.17.8

DL [illegible] 1694

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FAILURE REPORT

S 8227

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 PL1162 | 2. GLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: DAY SHIFT | 5. DATE OBSERVED: MO 8 DA 25 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 3 REST AMP	SD904-3	201	SSAC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ ENC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP R.C. ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 4 FAILED TO MEET THE PRE-GAIN RESISTOR (R90) SELECTION REQUIREMENTS WITHOUT USING A COMPONENT OUTSIDE THE SELECT RANGE. LIMITS: 2.61K TO 5.90K; VALUE: 2.49.

15. TEST PROCEDURE: 16597 | PARA: 4.5 | 16. ORIGINATOR: N.C. DAVISON III | ORG: 2213 | DATE: 8-25-81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: CONDITION VERIFIED AT TEST/SELECT STEP. NO PARTS OVERSTRESSED BY THE USE OF THIS RESISTOR VALUE.

19. FAILED ITEM NAME AND PART NUMBER: PRE-GAIN RESISTOR (R90)

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: AN OUT-OF-RANGE VALUE IS OBVIOUSLY REQUIRED TO MEET GAIN SPECIFICATIONS.

21. EVALUATION: [signature] | ORG: 2213 | DATE: 8/26/81 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NONE | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
N/A						

27. REWORK BY: N/A | ORG | DATE | 28. RETESTED BY: N/A | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: RANGE SPECIFIED IN 16597 NOT GRAND ENOUGH TO PERMIT ADJUSTMENT. E.O. TO SPEC IS REQUIRED TO INCREASE SELECT RANGE
RANGE WAS: 2.61K TO 5.90K
CHANGE TO: 2.21K TO 12.7K

31. FRB CLOSURE: [signature] 10/2/81 | ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: E.O. 3442 A-EFFECTIVITY S/N 003 & up

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☒ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☒ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2213 | DATE: 9/26/81
38. RELIABILITY: [signature] | ORG: [illegible] | DATE: [illegible]

39. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG: 2261 | DATE: 811021
40. CUSTOMER OR SUPPLIER: [illegible] | DATE

MAIN ABLR OPN # 2300

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP
FAILURE REPORT

S 8229

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
VOII T.M.		FLIGHT	N/A	MO 12 DA 01 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT			212-1	
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	(1/2 BAND)	51015	[redacted]	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNELS 1 & 2 EXHIBIT EXCESSIVE NOISE AFTER REPEATED CHANGES OF FETS.

ENGINEERING EVALUATION

15. TEST PROCEDURE: 16306 PARA 4.7 — 16. ORIGINATOR: A. C. DAVISON ORG 2213 DATE 12-01-81 — 17. CONTINUATION ☐ SHEET USED

18. VERIFICATION AND FAILURE ANALYSIS: Hybrid put on NCAR 392549 and sent to Westlabs for failure analysis. See IDC 12-60-01/RV-037 (ATTACHED)

19. FAILED ITEM NAME AND PART NUMBER: 50860 SN 215

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace Hybrid for ch 1 & 2 (V-1)

21. AUTHORIZATION: [signature] ORG 2722 DATE 12/1/81 — 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Hybrid replaced and unit retested good per supplement #1.

24. EA REWORK (S/A 1)

25. QA RETEST (S/A 2)

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMB
50860			SN 215			

27. REWORK BY: [signature] ORG 2273 DATE 1-11-82 — 28. RETESTED BY: [signature] ORG 2273 DATE 2/22/82 — 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: FAILURE ANALYSIS CONCLUDED THAT THIS WAS A RANDOM FAILURE. NO CORRECTIVE ACTION IS DEEMED APPROPRIATE (REFERENCE IDC 12-60-01/82-037, COPY ATTACHED) (REFERENCE IDC 12-60-01/82-042 COPY ATTACHED)

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: IDC 12-60-01/82-037, COPY ATTACHED

33. FRB CLOSURE: [signature] 1/6/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☒ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2721	1/6/82	[signature]	2241	1/6/82

39. RELIABILITY	ORG	DATE	40. BUYER OR SUPPLIER	DATE
[signature]	514	1-6-82	[signature] 1/12/82	

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58229

HUGHES AIRCRAFT COMPANY

INTERDEPARTMENTAL CORRESPONDENCE

TO: L. Wolthausen
ORG.: S8RC

CC: J. Adams
L. O'Connell

DATE: 14 July 1982
REF: 12-60-01/82-042

SUBJECT: Rationale for Failure Classification

FROM: J. Mazenko
BLDG: 604
EXT: 21218

MAIL STA.: 8253
ORG. CODE: 12-60-(

Silicon Preamplifier P/N 1950594/50860 serial number 215 was failure analyzed on 30 June 1982 (ref. IDC 12-60-01/82-037). The hybrid was found to be noisy on channel B. It was determined that transistor Q3 (2N4405) was defective. The failure was classified as random since no previous failures of this type had been seen. Below is a list of "Flight" Silicon Preamplifiers previously returned for retest and the disposition of same.

SILICON PREAMPLIFIER PART NUMBER 1950594/50860

PART NUMBER	APPROXIMATE RETEST DATE	DISPOSITION
116	10 NOVEMBER 1980	RETESTED. MEETS SPECIFICATION.
154	10 NOVEMBER 1980	OPEN PIN 10-13. MISSING WIRE BOND.
169	3 AUGUST 1981	RETESTED. MEETS SPECIFICATIO
193	11 MARCH 1982	OPEN PIN 10-13. WIRE BOND PIN 10-1 FUSED OPEN.
97	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
202	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
81	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
206	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
166	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
169	30 JUNE 1982	CHANNEL B OPEN.

(Note that serial #'s 165 and 169 were submitted twice for retest)

As seen from the data above, none of the Silicon Preamplifiers exhibited failures related to the 2N4405 transistor; thus, as previously stated it is assumed that the failure mode for Silicon Preamplifier serial # 215 may be classified as rand

JM/mlc

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S8229

HUGHES AIRCRAFT COMPANY

INTERDEPARTMENTAL CORRESPONDENCE

TO: L. Holthausen
ORG.: SBRC

CC: D. Adams
L. O'Connell

DATE: 14 July 1982
REF: 12-60-01/82-042

SUBJECT: Rationale for Failure Classification

FROM: J. Hazenko
BLDG: 604 MAIL STA.: B253
TEXT: 21218 ORG. CODE: 12-6(

Silicon Preamplifier P/N 1950594/50860 serial number 215 was failure analyzed on 30 June 1982 (ref. IOC 12-60-01/82-037). The hybrid was found to be noisy on channel B. It was determined that transistor Q3 (2N4405) was defective. Th failure was classified as random since no previous failures of this type had been seen. Below is a list of "Flight" Silicon Preamplifiers previously returr for retest and the disposition of same.

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97	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
202	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
81	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
206	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
166	30 JUNE 1982	RETESTED. MEETS SPECIFICATION.
169	30 JUNE 1982	CHANNEL B OPEN.

(Note that serial #'s 166 and 169 were submitted twice for retest)

As seen from the data above, none of the Silicon Preamplifiers exhibited failu related to the 2N4405 transistor; thus, as previously stated it is assumed tha the failure mode for Silicon Preamplifier serial # 215 may be classified as ra

58229

HUGHES AIRCRAFT COMPANY

INTERDEPARTMENTAL CORRESPONDENCE

TO: L. Walthausen
ORG: SBRC

CC: D. Adams
L. O'Connell

DATE: 30 June 1982
REF: 12-60-01/82-037

SUBJECT: Failure Analysis of Silicon Preamplifier Hybrid

FROM: J. Mazenko
BLDG: 604 MAIL STA.: B253
EXT: 21218 ORG. CODE: 12-60-01

SILICON PREAMPLIFIER

PART NUMBER: 1950594/50860
SERIAL NUMBER: 215
DATE CODE: 2880

The above hybrid was retested per SBRC Spec. #16099 and found to be out of spec. on Channel B for spectral noise at both 10 KHZ and 20 KHZ.

The hybrid passed fine leak, gross leak and pind test. Upon delidding the cause of failure was determined to be Q3 a 2N4405. Q3 was replaced with a dice from lot 8-7066 (the same lot as used in the original hybrid build). The hybrid was then retested and found to be within spec. The test results are shown below.

Spec limit <1.7 nV/ $\sqrt{HZ}$ (Paragraph 1.6 of Spec #16099)

FREQUENCY	DATA 7/24/80	DATA 6/10/82	Q3 REPLACED 6/29/82
10 KHZ	1.3 nv	2.3 nv	1.5 nv
20 KHZ	1.4 nv	1.8 nv	1.4 nv

Since no other failures of this type have been seen this may be assumed to be a random failure.

J. J. Mazenko
Manager Technical Staff
Technical Support Laboratory
Engineering Services & Support Division

JM:mlc

SBRC

ASSEMBLY HISTORY RECORD SUPPLEMENT

SHEET 1 OF 3

PART NUMBER	SERIAL OR LOT NUMBER	DRAWING NO.	DRAWING DIVISION	MFA SOURCE CODE	PREPARED BY	SUPPLEMENT NO. / AHR DATED
51015-1	212	51015	D	21-21	J. Wells	1 10 10-19-81

PURPOSE OF SUPPLEMENT - INCORPORATES NEW ASSY DRAWING REVISION FOR ECO [ ]; REWORK [ ]; OTHER [ ]. EXPLAIN:

[redacted]

APPLICABLE ECO:

RESPONSIBLE APPROVAL: J. Wells

QUALITY APPROVAL: [signature]

PURCHASING APPROVAL:

SYSTEMS ENG. APPROVAL: [signature]

OTHER:

OTHER: AFQA [signature]

SUPPLEMENT RELEASE DATE 12-17-81

NOTE TO PRODUCTION - UPON RECEIPT, ENTER SUPPLEMENT NO. AND RECEIPT DATE ON FRONT SHEET OF AHR. INITIAL THE ENTRY.

NOTES: SAME AS ORIGINAL AHR

STATIC SENSITIVE ITEM
HANDLE PER SPC9113

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
		[redacted]				
		PURPOSE: [redacted]				
2301	21-21	Kit (1 ea.) Hybrid (Item 6) per B/P & ABC/TR.	[signature]		12/8/81	
2302	51-14	Kit Inspect Operation #2301 per B/P & ABC/TR.		[signature] 1 118	ACCEPT 12/21/81	
				[signature] 1	REJECT	NCAR 372546 CLOSED
2303	22-73	1) Remove Hybrid U1 (Item 6) from preamp assy. (Bag and identify removed part.) Submit to inspection.	[signature]	[signature] 1 118 1 212	12-21	SEE COMMENT SHEET # 2 NCAR 372546
		2) Install wire and insulating tubing (Items 15 816) to				

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S8229

[SBRC] ASSEMBLY HISTORY RECORD CONTINUATION SHEET — SHEET 2 OF 3

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
51015-1	212	SILICON PRE-AMP ASSY	AHR DATED 10-19-81 AHR SUPPLEMENT NO. 1

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	DATE	REMARKS
2303	22-73	Continued				
		3) Install Hybrid (Item 6) at U1 to preamp assy per B/P	JRC		1-11	
		and Note 3. NOTE: Observe correct pin location,				
		(Ref. zone 5D)				
				[illegible]	1-12-82	
2304	51-14	Inspect operation #2303 per B/P. Put removed Hybrid on		[illegible] 1202	1-0-82	
		N.C.M.R. Record N.C.M.R. # 342549.				
		STATIC SENSITIVE ITEM HANDLE PER EP80113				
2305	MCI	MANDATORY CUSTOMER INSPECTION		[illegible]	1/13/82	
2306	22-13	1) Notify Q.A. & A.F. before testing.				
		NOTIFIED AF DEPT 1/14/82. CHECKED ALL TEST EQUIPMENT TO BE USED PRIOR TO TEST W/S DEPT 1/14/82.		[illegible] 1212	1/14/82	SEE FR 8206 W/ COMMENT SHEET #2
		[redacted]			1/14/82	
		* NOTE: Attach test data to AHR.				SEE RETEST ON COMMENT SHT #2
2307	51-14	[redacted]				
		* NOTE: Spot bonding of Hybrid will be performed on m/n				

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S8229

4.7 Wideband noise

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Limit: 2.4 pA

Ch	Meter	Gain*	Pre-Amp Output	R.B. Noise	RFB
1.	.84 V	350	2.40 mV	2.1 pA	1.15 x 10^9 Ω
2.	.84		2.40	2.2	1.10
3.	.69		1.97	2.3	.85
4.	.72		2.06	2.3	.90
5.	.76		2.17	2.1	1.05
6.	.76		2.17	2.2	.97
7.	.66		1.89	1.9	1.00
8.	.70		2.00	2.1	.96

* [illegible] Gain For (In dB) - Post Amp Gain (In dB) For The Wideband Gain Converted From dB to Gain

$$\log^{-1}\left\{\left[\frac{3.81}{\text{Gain (dB)}} - (26.91) + 27.79\right]\right\} = 350$$

Design Engineer [signature] III Date: Feb. 22, 1982

Test Engineer E.R. Cane Date: 2-22-82

SIZE	CODE IDENT NO.	NUMBER
A	11323	16306
SCALE	REV -	SHEET 12

5229

MODEL EFFECTIVITY	REVISIONS SYM	DESCRIPTION	DATE	APPROVED
		INITIALLY RELEASED 9-5-78		
FIRST USE	D	Completely revised and retyped to incorporate new system specs & update test procedures. As required by ECR TM1103/01.	12-6-79.	
ER. No. 2 & SUBQ.	E	Incorporated EO 1610	80-8-29	
51065 SER. No 002 & Subq.	F	Paragraph 4.6 added: Transient response---- gold wires are not damaged. as req by ECR TM 1913/01.	80-09-12	
51065 W CC3 SUBQ.	G	Incorporated E. O. 2149A	12-2-80	
065 SN & SUBQ	H	INCORPORATED EO 2960A.	81-4-20	
065 S/N & SUBQ	J	Changed by Revision Notice per ECR No. TM 2339/01	81-5-22	

REF. SUFF-1 FOR REPLACEMENT OF HYBRID
REF. P/N 5229

MAIN AHR
OP. No. 2300
AFTER TRYING
3 (THREE) DIFFERENT
FET'S ON CH. 1, 2
NO CHANGE IN EXCESSIVE
NOISE.
RECOMMEND INSTALL
NEW HYBRID PREAMP.
C.R. Lee 12-01-81

REVISION STATUS THIS PRINT
NOT MAINTAINED AFTER
NOV 23 1981
DO NOT USE THIS PRINT
UNLESS YOUR ORDER OR INSTRUCTIONS
SPECIFY THIS REVISION LEVEL SHOWN

EO 2960A

12-1-81

CONTRACT NO.	SANTA BARBARA RESEARCH CENTER A Subsidiary of Hughes Aircraft Company GOLETA, CALIFORNIA	
NAS 5-24200		
PREPARED 11-1-71	TITLE TEST PROCEDURE FOCAL PLANE PREAMP ASSEMBLY	
CHECKED 11-1-79		
APPROVED 11/8/79		
	SIZE A	CODE IDENT NO. 11323
		NUMBER 16306

4.7 Wideband noise

Limit: 2.4 pA

Ch	Meter	Gain*	Pre-Amp Output	W.B. Noise	Rob
1.	** V		mV	pA	1.15 X 10⁹Ω
2.	**				1.10
3.	.66	343	1.92	2.3pA	~~.84~~, 85
4.	* .68	343	1.98	2.2pA	.90 ~~1.04~~ 1.05 CH
5.	.77	343	2.24	2.1	
6.	NO	RESPONSE			.97
7.	NO	RESPONSE			1.00
8.	.73	343	2.13	2.2pA	~~.98~~ .96 CH

Noise = {[7.26 - (-15.88) + 27.55]} / 343

Design Engineer _____ Date: _____

Test Tech. Engineer C. R. Lane Date: 11-25-81

Q.A. Engineer CH 4 IS 2.2 pA W.B.N WITH WIRE PULLED) CH 1,2 V. NOISEY - NO WRITTEN DATA - CH 6,7 NO RESPONSE Date: 12/02/81

* CH. 4 DATA WITH DETECTOR WIRE PULLED - NEED NEW DETECTOR

** CH. 1-2 VERY NOISEY - NEED NEW FET'S

CH. 6-7 TRY NEW DETECTORS

SIZE	CODE IDENT NO.	NUMBER
A	11323	16505
SCALE	REV	SHEET 12

58229

4.7 Wideband noise

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Ch	Meter	Gain*	Pre-Amp Output		R_{FB}
1.	1.35V	____	3.94 mV	3.4 pA	1.15×10^9 Ω
2.	~~2.5000~~ 4.0V	NOISEY (VERY)		____	1.10
3.	____	____	____	____	.85
4.	NO RESPONSE		____	____	.90
5.	____	____	____	____	1.05
6.	PEGGED	____	____	____	.97
7.	.70	343	2.04	2.0	1.00
8.	____	____	____	____	.96

* Gain = Test Amp-Out Put (in dB) - Post Amp Input (in dB)
- Scope Gain (in dB) For The 10mV/div Scale
Converted From dB to Lin

$$\log^{-1}\left\{\left[\frac{7.26 - (-15.88) - 27.55}{20}\right]\right\} = 343$$

Design Engineer _____ Date: _____

~~Test~~ TEST Engineer C.R Lee Date: 12-01-81

Q.A. Engineer P.G Ryan Date: 12/01/81

CH. 1, 2 NEW FET
CH 4, 6 NEW DETECTOR

INITIAL TEST AFTER REWORK ON
CH. 1, 2, 4, 6, 7

SIZE	CODE IDENT NO	NUMBER
A	11323	1-9405
SCALE	REV	SHEET 12

MAIN AHR - CP# 2600

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 831

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM V011		FLIGHT	3:30 AM.	MO 8 DA 26 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	OAR	50904-3	201	
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAND # 3	50797	201	SERC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL 4 NOISE IS 2.6 pA; CHANNEL 9 NOISE IS 2.9 pA. SPECIFICATION 16597 REQUIREMENT IS 2.4 pA OR LESS. RECOMMENDATION: BAND TO BE REMOVED AND RETURNED TO MANUFACTURER

15. TEST PROCEDURE: 16597 | PARA 4.7 | ORIGINATOR H.C. DAVISON II | ORG 2215 | DATE 8-28-81 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: FR to be closed via waiver W-116

21. AUTHORIZED BY: [signature] | ORG 2122 | DATE 11/9/81 | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NO.
50603						

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: The noise on channel 4 has been high since the amp was built and is a function of the noise of the FET detector. Channel 9 became noisy due to a change in its detector. The effect of the change is being studied and the test is being conducted on a detector with a shorter effective time constant. The trapezoid setting times being used are at 30 μs

31. FRB CLOSURE: [signature] 11/12

31. CONTINUATION SHEET USED ☒

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W-116 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2122	11/9/81	[signature]	2241	12/18/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	5141	12-8-81	N.A.	

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SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

59377 CONT. SHE LETTER*
FR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON
IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

ADDITIONAL F CONTINUATIO SHEET(S) USED

14 The following channels do not meet the setting time requirement of 1 ms

Limit	1.5%	1.0%	
Channel	30 μsec	60 μsec	1% bw
1	2.0%	.2%	35 μsec
2	2.0	.1	35
3	1.8	0	33
4	2.4	.2	31
6	1.8	0	33
8	2.6	.2	50
10	2.6	.4	45
12	1.8	.5	48
14	2.0	.2	31
15	2.0	.2	31
16	2.0	.4	50

30 and all are settled within 1% by ± 50 μsec. This is the best that can be expected with present design.

16060A SC AUG 78

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5 8317 FR V

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR SSP FOR INSTRUCTIONS)

DATE PREPARED
11-10-81 PFR

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS
David M. Kandall
SBRC, 75 Coromar Drive, Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. JUSTIFICATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. WBS/CWBS	c. SYS. CODE	d. DEV/WAIVER NO
F	11323	IM	W-116

5. BASE LINE AFFECTED
[X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
[ ] YES [ ] NO

7. CONFIGURATION ITEMS AFFECTED/TEST PLAN

a. NOMENCLATURE	b. WBS/CWBS	c. PART/TYPE NO.	d. SER. NO.
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

a. NOMEN. CODE	b. NUMBER	c. REV.	d. SUB. NO.
11323	50797	E	

9. TITLE OF DEVIATION/WAIVED
Permission to use Band 3 Band Level Assys SN 201

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. NOMENCLATURE
Radiometer

12. CD NO.
II

13. EFFECT NO.

14. MAJOR CLASSIFICATION
[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF ITEM OR COMPONENT ASSEMBLY AFFECTED
Band Level Assy

16. PART NO. OR TYPE NUMBER
50797

17. LOT NO.
201

18. QTY
1

19. RECURRING DEVIATION/WAIVED
[ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $100,000-if not approved.

21. EFFECT ON DELIVERY SCHEDULE
3 to 4 months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVED

Permission to use Band 3 Band Level Assy SN 201 with Ch 4 noise of 2.6 pA and Ch 9 noise of 2.9 pA vs a spec of <2.4 pA and Channels 1, 2, 3, 4, 6, 8, 10, 12, 14, 15 & 16 not meeting transient response settling time requirement of ≤1.5% by 30 ms. Copy of FR 8317 attached.

24. NEED FOR DEVIATION/WAIVED

Noise performance of Ch 4 & 9 will still allow system signal to noise performance to be met and all channels have transient responses that settle to 1% by ≤50ms. The rework required to correct the discrepancies described above is not considered cost or schedule effective.

REA D.M. Kandall SYS ENGR J.E. Evans RE J.E. Evans 11/16/81
QA W.P. Adams 11/16/81
PE Louis E. Williamson 11/16/81

25. APPLICABLE SPECIFICATION OR DRAWING NUMBERS
003

26. J.E. Phillips 11/16/81
Minor - System Engineering
Major/Critical - Program Manager

27. [ ] APPROVAL RECOMMENDED

28. [X] APPROVED [ ] DISAPPROVED
J.E. Evans 12.17.81

DD FORM 1694

AHR Oper 2600 P/N 50797 Band 1

HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8318

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM Voll PL1162		FLIGHT	DAY SHIFT	MO 9 DA 17 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	Ext Band 1 Pre-Amp	50797	401	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMP 16 °C ☐ THERMAL VAC ____ HRS AT ____ °C ☐ EMC/RI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH's 1, 5, 9, 13 Exhibit Out of Spec Transient / Frequency Response and High Noise

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16597	4.6	C.P. Lane	2213	09-17-81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Diagnostic testing Removed the S. Meter to be at fault.

19. FAILED ITEM'S NAME AND PART NUMBER: S. Meter, 50803

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Replace Meter

21. AUTHORIZATION: [signature] ORG 2122 DATE 11/18/81 — 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Meter replaced and Band 1 Pre-Amp retest successfully. Successive burn testing on Lot no. 7R of 50440 (COPY ATTACHED) — 24. QA REMARKS — 25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
50803		1033-29				

27. REWORK BY ____ ORG ____ DATE ____ — 28. RETESTED BY ____ ORG ____ DATE ____ — 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause of failure is unknown. Meter assy is presently scheduled to undergo life testing followed by analysis to determine cause. UNIT ACCEPTABLE PER DWG W123

31. ☐ CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W123 (COPY ATTACHED)

33. FRB CLOSURE: [signature] 12/17/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEMS ENGINEER	ORG	DATE
[signature]	2122	11/18/81	[signature]	2249	12/18/81
39. RELIABILITY [signature]	ORG 51-41	DATE 12-18-81	40. CUSTOMER OR SUPPLIER		DATE

Program Instruction 010

58318

ORIGINAL PAG
OF POOR QUA

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAI

3. [ ] MINOR [X] MAJOR [ ] CRI

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES [X] NO
F	11323	TM	W-123				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	MOD. NO.
a. SYSTEM							
b. ITEM				11323	50797	E	—
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER: Permission to use Band 1 Band Level Assy SN 401

10. CONTRACT NO. & LINE: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.: II

13. DEFECT NO

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRIT

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 1 Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797-E

17. LOT NO.: 401

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,00-if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Six weeks

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Band 1 has a number of channels with transient/frequency response discrepancies as defined by FR 8440. Attached is a copy of FR 8440 and transient response plots for all channels. Channel two has average crosstalk between non-neighbors of -59dB vs a specification of ≤-60dB.

24. NEED FOR DEVIATION/WAIVER

Band 1 has been bonded into the FPA assy and discrepancies are not considered sig
enough to warrant rework on a cost/schedule impact basis.

REA D.M. Randall 11/20/81 SYS ENGR L.L. Conard PE

QA T.R. Williams

CMO

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

003 51065 SERNC 003 CNLN

26. H.K. Rhettigan 11/23/81

27. Minor - System Engineering
Major/Critical - Program Manager

28. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

29. SIGNATURE: T.R. Williams DATE: 12.17.8

DD 694

AHR 50797 in U.I. Branch
Oper 2600
W117

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8322

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. V011		FLIGHT	4:00 p.m.	MO 9 DA 28 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND FOUR	50797	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP. 15 °C ☐ THERMAL VAC ____ HRS AT ____ ° ☐ OTHER ____
AXIS FOR ____ MIN TYPE ____

14. DESCRIPTION OF FAILURE: CHANNELS 13 EXCEEDS TRANSIENT RESPONSE IS -45 DB ~~@ 1.50 MHz~~. CHANNELS 1, 5, 9, 13 & 15 HAVE NON-NEAREST NEIGHBORS -58 DB FOR CROSSTALK. SPEC. REQUIREMENT: -60 DB

15. TEST PROCEDURE: 16597 | PARA 4.6, 4.8 | 16. ORIGINATOR: M. C. DAVISON | ORG 2213 | DATE 9-30-81 | 17. ☒ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

18a. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: FR will be closed via WO#W-117
Failed in one of attenuation specifications, itself component to have been overstressed.

21. AUTHORIZATION: R. Randall | ORG 2122 | DATE 11/9/81 | 22. ☒ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☒ CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Crosstalk discrepancies are traceable to the use of flat cables within the unit and tested. The transient response timing discrepancies are not taken to be critical since timing tolerances are not specified in the unit specification. Closure of this FR is recommended.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W117 (COPY ATTACHED)

33. FRB CLOSURE: 12/1/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ HANDLING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG 2122 | DATE 11/9/81

38. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG 2241 | DATE 12/18/81

39. RELIABILITY | ORG | DATE

40. CUSTOMER OR SUPPLIER | DATE

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EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

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58322 CONT. SHT LETTER*
FR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL F CONTINUATIO SHEET(S) USEC

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

14

Limit	1.5%	1.0%	
11 Hours	30 μs	60 μs	18 Hz
~~25~~	~~26%~~	10%	60 μs
13	2.0	2.0	90 μs
14	2.0	.8	50
15	2.0	.5	33
16	1.9	0	32

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Program Instruction 019

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 11-10-81

PROCURING ACTIVITY NO.: S8322

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SSRC, 75 Coromar Dr. Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESCRIPTION FOR DEVIATION/WAIVER

4a. CLASSIFICATION	4b. WBS ITEM	4c. SYS ORGID	4d. SPECIFICATION NO.
F	11323	TM	W-117

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	7a. WBS ITEM	7b. SPEC/DOC NO.	7c. SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

8a. DWG. SIZE	8b. NUMBER	8c. REV.	8d. WBS NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER: Permission to use Band 4 Band Level Assy SN 201

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. TARGET NO.

14. SAFETY CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF NEXT HIGHER ASSEMBLY AFFECTED: Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797

17. UNIT NOS.: 201

18. NOS.: 1

19. [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000-if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Three to four months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 4 Band Level Assy SN 201 with Channels 5, 13, 14 15 & 16 exceeding transient response settling time specification, and Channels 1, 5, 9, 13 & 15 have -58dB crosstalk vs a specification of -60dB.

Channel	30µs	60µs	1% by
5	2.0%	1.0%	60µs
13	2.0	2.0	90µs
14	7.0	.8	50µs
15	2.0	.5	33µs
16	1.9	0	32µs

24. REASON FOR DEVIATION/WAIVER

The rework required to correct the discrepancies noted above is not considered cost or schedule effective.

REA: [signature] SYS ENGR: [signature]

PE: [signature] 11/16/81

QA: [signature] 11/16/81

PE: [signature] 11/16/81

25. PROGRAM EFFECTIVITY OR SERIAL NUMBER: 003

26. APPROVING ACTIVITY: [signature] 11/16/81

Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL RECOMMENDED: [ ]

[X] APPROVED

[ ] DISAPPROVED

SIGNATURE: [signature] DATE: 11/17/81

AHR 50797 S/N 401 Band 4
Oper 2600

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

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FAILURE REPORT

S 8323

ORIGINATOR

1. PROGRAM NAME AND NUMBER: T.M. V011 | 2. GLA: V011 | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 12:45 PM | 5. DATE OBSERVED: MO 9 DA 30 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT	Alt Data Rcvr Band-Pass Assy 15512			
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAND 4 PRE AMP	50797 (D)	701	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD		E.O. 30654		
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ RMS TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: NO CONTINUITY BETWEEN J2-16 AND J2-10. ON EVEN SIDE OF PRE-AMP ASSY

15. TEST PROCEDURE: 16597 | PARA: 4.9 | 16. ORIGINATOR: A.C. JAYCOX | ORG: 2243 | DATE: 9-30-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: NO CONTINUITY BETWEEN PIN 13 OF U3 HYBRID AND OTHER PINS (6, 10 & 24) DESIGNATED AS SIGNAL GROUND, CLEARLY INDICATING THAT U3 HAS FAILED.

19. FAILED ITEM NAME AND PART NUMBER: HYBRID / 50860

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Replace Hybrid U3 and retest Hybrid S/N 193

21. AUTHORITY: [signature] | ORG: 2122 | DATE: 10/1/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Hybrid replaced and retested good. No evidence of any components having overheated from the Hybrid.

24. QA [signature] 35

25. QA [signature] 35

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM
50860 (REMOVED)		S/N 193		HAC	MISSING BAND WIRE FROM PIN 13 TO SUBSTRATE	
INSTALLED		S/N 160				

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: PART SENT FOR FAILURE ANALYSIS. FAILURE MAY BE A MISSING BOND WIRE FROM PIN 13 TO SUBSTRATE (SEE ATTACHED MEMO, HS236-7598). CORRECTIVE ACTION WAS TO REPLACE HYBRID. FAILURES OF THIS TYPE CANNOT GO UNDETECTED BECAUSE CONTINUITY BETWEEN P.N 13 AND THE SUBSTRATE IS TESTED BY TEST PROCEDURE 16597. MANUFACTURING HAS BEEN ADVISED. CAUSE UNKNOWN - SEE ATTACHED IDC 82/12-60-02-106 MEMO

31. ☒ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE REQ'D

33. FRB CLOSURE: [signature] 3/16/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2122 | DATE: 11-3-81 | 38. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG: 22-41 | DATE: 3/15/82

39. RELIABILITY: A. Hunter | ORG: 51-11 | DATE: 11-02-81 | 40. CUSTOMER OR SUPPLIER: [signature] | DATE

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT
CONTINUATION SHEET

FR SERIAL NO. 58323
CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

30 HS 236-7598 WAS WRITTEN PRIOR TO RETURNING THE DEVICE FOR FAILURE ANALYSIS. THE HYPOTHESIS AT THAT TIME (10-26-81) WAS THAT THE CAUSE WAS THE SAME AS NOTED ON 50860 S/N 88, WHICH WAS A MISSING BOND WIRE. FAILURE ANALYSIS AS DOCUMENTED IN IDC 82/12-60-02-101 SHOWS THE CAUSE TO BE INDETERMINATE. OF THE THREE POTENTIAL CAUSES LISTED, THE REVERSAL OF HYBRID ON THE PC BOARD IS RULED OUT BECAUSE A FUNCTIONAL TEST PRECEDES THE CONTINUITY CHECK OF TP 16597 PARA 4.9. THIS ALSO RULES OUT THE POSSIBILITY OF APPLICATION OF POTENTIAL BETWEEN PINS 10 AND 13 AS THE UNIT WAS IN NORMAL TEST/OPERATING CONFIGURATION AT THE TIME FAILURE WAS NOTED.

THE FAILURE WAS FIRST NOTED AT THIS POINT OF THE TEST PROCEDURE BECAUSE THERE IS NO RECEIVING TEST INSPECTION FOR THIS FUNCTION. SOURCE INSPECTION IS UTILIZED AND DATA IS FORWARDED TO THE USER. THE POSSIBILITY OF REVERSAL IN TEST FIXTURE AT SUPPLIER'S FACILITY IS ONE OF SEVERAL ~~FAILURES~~ POSSIBLE METHODS OF INDUCING THIS FAILURE. THEREFORE, CAUSE UNKNOWN IS CHECKED IN ITEM 34.

THE LAST 50860 WAS DELIVERED ON 11-24-80.

A MISSING BOND BETWEEN PINS 10 & 13 RESULTED IN A CHANGE TO THE MANUFACTURING TEST PROCEDURE JUST PRIOR TO 8-19-81. THIS TEST PROCEDURE CHECKS CONTINUITY BETWEEN ALL GROUND RETURN PINS. THE MANUFACTURER HAS BEEN ADVISED OF THE FAILURE THAT IS REPORTED HERE AND ~~CORRECTIVE~~ THE USERS AT SBRC HAVE ALSO BEEN ALERTED. THIS SHOULD PRECLUDE RECURRENCE OF SIMILAR PROBLEMS ON FUTURE PROCUREMENTS.

5'8323

HUGHES AIRCRAFT COMPANY

INTERDEPARTMENTAL CORRESPONDENCE

TO: L. Wolthausen
ORG: SBRC

SUBJECT: Failure Verfication Of Thematic Mapper Silicon Preamp Hybrid

CC: L. O'Connell
F. Carle
R. Nelson
E. Furuya

DATE: 11 March 1982
REF: 82/12-60-02-101

FROM: J. Mazenko
BLDG: 604 MAIL STA. B253
EXT: 21218 ORG. CODE: 12-60-01

Thematic Mapper Silicon Preamplifier Hybrid P/N 50860/1950594-100 was returned to the author for failure verification and analysis. The results of the investigation are given below.

Initial Failure Indication - Open between pins 10 and 13 (Detector Return B)

Failure was confirmed by Electrical Test. The hybrid was then subjected to Pind Test, Fine Leak Test and Gross Leak Test. The hybrid passed all of these tests. The hybrid was then decapped for visual inspection. Visual inspection revealed that the wire bond which connects the two conductor traces on the hybrid substrate (see attached photographs) joining pin 10 to pin 13 was fused open.

The actual cause of failure is indeterminate. However, several potential causes are listed below.

1. Reversal of hybrid in test fixture.
2. Reversal of hybrid on PC board.
3. Improper potential applied to pin 10 or 13 during probing or trouble shooting of PC board.

J. Mazenko
Manager Technical Staff
Technical Support Laboratory
Engineering Services & Support Division

HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8324

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
VOII TM		FLIGHT	1ST SHIFT	MO 10 DA 01 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	Band Bandpass	50797	401	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ JAN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH'S 1,5,9 +3 FREQUENCY RESPONSE OUT SPEC. CH. 1; -3.1 dB, CH. 5; -3.05dB, CH. 9; -3.06dB AT 52K HZ. SHOULD BE -3+0/-0.5 dB CH'S 2,3,6,7,11,12,13 EXCEED TRANSIENT RESPONSE SPEC AT 30 & 60nS

15. TEST PROCEDURE: 16597 PARA 4.6.4.8 | 16. ORIGINATOR: C. R. Lee | ORG 2213 | DATE 10-06-81 | 17. CONTINUATION SHEET USED ☒

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: FR to be closed via waiver W-115 Failure is one of not meeting specification, the pieces components had been previously

21. AUTHORIZATION: [signature] | ORG 3122 | DATE 11/9/81 | 23. CONTINUATION SHEET USED ☒

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Frequency response and crosstalk requirements are some of the more stringent requirements for the "state of the art" under which this Receiver was built and tested. The transient response setting from frequency response adjustment may be due to coaxial shields being pushed closer together during assy of Bandpass. Operator cautioned to use care not to overbuild

31. CONTINUATION SHEET USED ☐

31. FRB CLOSURE: [signature] 11/18/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W115 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER [signature] ORG 3122 DATE 11/9/81 | 38. SPACECRAFT SYSTEM ENGINEER [signature] ORG 93-41 DATE 12-10-81

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

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S 8324 CONT. LETTER
PR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL CONTINUATION SHEET(S) U

IDENTIFY ENTRIES BY REFERENCING PR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

14 CH's 5,7,9 Do N. + MEET -60dB NON-NEIGHBORS AVER
REQUIREMENTS FOR CROSS TALK: 5, -57.4; 7, -57.4; 9, -57.4

15 16597 PARA. 4.6, 4.8

16 C.R. Low 22-13 10-01-81

1	1	30 μs	60 μs	1% bps	70 μs
2	2.0 V	1.5 V	1.5 V	1.5 V	1.07
3	1.5 V	1.2 V			
6	2.0 V	2.0 V			
7	2.0 V	1.5 V			
8	2.0 V	1.5 V			
9	1.2 V	1.5 V			
11	2.0 V	1.5 V			10/21/81
12	1.5 V	1.5 V			
13	2.0 V	1.5 V			
4	1.2 V	1.5 V			

Limit 1.5 V 1.07

14	Channel	30 μs	60 μs	1% bps	
	2	1.0 V	1.2 V		70 μs
	6	1.5	1.9		127 μs
	7	0	1.5		80 μs
	8	2.0	1.2		35 μs
	9	.2	1.5		92 μs
	11	1.2	1.7		90 μs
	12	2.0	1.7		90 μs
	13	.4	1.7		95 μs

16060A SC AUG 78

COPY 1 ROUTE WITH DISCREPANT ITEM

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Program Instruction DICP

5-8324

H&P

PFR

DATE SUBMITTED: 11-10-81

1. ORIGINATOR (Name and Address): David M. Randall
SSRC, 75 Cormorant Drive, Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. IDENTIFICATION FOR WHICH APPROVAL/WAIVER

a. MODEL/TYPE	b. WBS CODE	c. SYS. DESIG.	d. DRAWING NO.
F	11323	IM	V-115

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATIONS AFFECTED: [ ] YES [ ] NO

7. DOCUMENTS AFFECTED/"AS" PLAN

	WBS. CODE	SPEC. DOC. NO.	SCN
a. SYSTEM			
b. SYS.			
c. "AS" PLAN			

8. DRAWINGS AFFECTED

WBS CODE	NUMBER	REV.	MOD. NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER
Permission to use Band 2 Band Level Assy SN 401

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. IDENTIFICATION FOR NONCONFORMANCE
Radiometer

12. CD NO.: II
13. EFFECT ON:
14. CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF NEXT HIGHER ASSEMBLY AFFECTED: Band Level Assy
16. PART NO. OR TYPE NO.: 50797
17. LOT NO.: 401
18. QTY:
19. ACCOMPANYING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000 - if not approved
21. EFFECT ON DELIVERY SCHEDULE: 3 to 4 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. IDENTIFICATION OF NONCONFORMANCE/WAIVER
Permission to use Band 2 Band Level Assy SN 401 with Ch 1, 5, 9 & 13 not meeting frequency response of >-3dB @ 32KHZ (-3.1dB, -3.05dB & -3.06dB respectively); Ch 5, 7 & 9 have non-neighbor crosstalk of -59dB, -59dB & -58dB respectively vs a spec of <60dB; and Ch 2, 6, 7, 8, 9, 11, 12 & 13 do not meet settling time requirements. Copy of FR 8324 attached.

24. NEED FOR DEVIATION/WAIVER
The rework required to correct the discrepancies noted above is not considered cost or schedule effective.

REA: DM Randall
SYS ENGR: JL Enger
RE: [illegible] 11/16/81
QA: H P Blair [illegible]
PE: Donald Robinson 11/16/81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 005

26. SIGNATURE: H P Blair 11/16/81

Minor - system engineering
Major/Critical - Program Manager

27. [ ] APPROVED [ ] DISAPPROVED

28. ASSESSMENT ACTIVITY:

29. "AS" USE: [ ] APPROVED [ ] DISAPPROVED
DATE: 12.17.81

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8341

ORIGINATOR

1. PROGRAM NAME AND NUMBER: VOII | 2. GLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: 11:30 a.m. | 5. DATE OBSERVED: MO 10 DA 26 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☒ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 1 POST AMP	50904-1	101	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 15 °C ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: TRANSIENT RESPONSE VERY BAD

15. TEST PROCEDURE: 16597 | PARA | 16. ORIGINATOR: N. C. DAVISON III | ORG: 2213 | DATE: 10-26-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: RESISTORS R72 (ROLLOFF 24.3K -259) AND R88 (GAIN 6.34K -203) ARE REVERSED. NO OVERSTRESS ACCURED. REF HS236-7743 COPY ATTACHED.

19. FAILED ITEM NAME AND PART NUMBER: BAND 1 POST AMP 60 50904

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: REVERSE R72 AND R88 AND RETURN TO FINAL TEST.

21. AUTHORIZATION: N. C. DAVISON III | ORG: 2213 | DATE: 10-26-81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: R72 (ROLLOFF, 24.3K) AND R88 (PREAMP, 6.34K) WERE INSTALLED IN THEIR PROPER LOCATIONS. NO OVERSTRESS OCCURRED

24. QA REWORK: [signature] 11-17-81

25. QA RETEST: [signature] 11-17-81

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM
NONE (NO INTERCHANGE)	REF	HS236-7743 DATED 11-20-81 (COPY ATTACHED)			OVERSTRESS OCCURRED AS A RESULT OF THE RESISTOR	

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: WORKMANSHIP ERROR WHEN MOVING SELECT RESISTORS FROM STANDOFFS TO THE BOARD. PERSONNEL HAVE BEEN READVISED TO USE CARE WHEN REMOVING AND REINSTALLING COMPONENTS

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NONE REQ'D HS 236-7743 COPY ATTACHED

33. FRB CLOSURE: [signature] 11/18/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2212	11/17/81	[signature] for J. Engel	22-41	11/17/81
39. RELIABILITY: R. Huber	ORG: 51-11	DATE: 11-13-81	40. CUSTOMER OR SUPPLIER: G.D.		DATE

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

3341

TO: L. O'Connell

CC: See Distribution List

DATE: 20 November 1981

REF: HS 236-7743
REAH 81/64

FROM: A. Huber

SUBJECT: Subject: FR: S8341
(Band 1 Postamplifier Bd,
50904, Flt)

BLDG. B-11 MAIL STA. 102
EXT. 6246

FR: S8341, Dated October 26, 1981

The failure was encountered during retest of Band 1, Channel 15, after select resistors were removed from standoffs and placed directly onto the board. It was found that the pregain resistor R88(6.34K) and rolloff resistor R72 (24.3K) were interchanged. The resistors were subsequently removed and reinstalled in their proper locations. Figure 1 illustrates the postamplifier pregain and roll-off stages. In general no overstress will occur as a result of an interchange of pregain and postgain resistors. The postamplifier has been designed so that any intermediate amplifier stage can saturate without causing a condition of overstress.

Andrew E. Huber
A. Huber

AH:jc

MAIN AHR
OP. No. 1900

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8342

ORIGINATOR

1. PROGRAM NAME AND NUMBER: V011 TM | 2. GLA | 3. MODEL: FLIGHT | 4. TIME OBSERVED: FIRST SHIFT | 5. DATE OBSERVED: MO 10 DA 24 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY		50795	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS (OR) ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 4, CH. 16 WIDE BAND NOISE IS 2.8pA SHOULD = 2.4pA

15. TEST PROCEDURE: 16597 | PARA: 4.7 | 16. ORIGINATOR: C. R. Lore | ORG: 2213 | DATE: 10-24-81 | 17. CONTINUAT ☐ SHEET USE

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Si Detector Noise increased

19. FAILED ITEM NAME AND PART NUMBER: 50803

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Buy Rest for schedule Waiver Rfl W-118

21. AUTHORIZATION: [signature] | ORG: 2121 | DATE: 10/24/81 | 22. CONTINUAT ☐ SHEET USE

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NONE - PROCEED WITH WAIVER W-118

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NU

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUA ☐ SHEET USE

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause of increase in Si Detector noise is unknown. Analysis indicates that the system level radiometric sensitivity requirements will still be met.

31. FRB CLOSURE | 31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: W118 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2121 | DATE: 2/23/82

38. SPACECRAFT/SYSTEM ENGINEER: [signature] | ORG: 22-41 | DATE: 2/24/

39. RELIABILITY: [signature] | ORG: 5111 | DATE: 2-22-82

40. CUSTOMER OR SUPPLIER: BAE | DATE:

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2/17/82

PROCURING ACTIVITY NO.: S8342

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr, Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-118

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	50795	H	-

9. TITLE OF DEVIATION/WAIVER: Permission to use PFPA with Band 4 Ch 16 noise of 2.8 pA

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 4 Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797-E

17. LOT NO.: 401

18. QTY: 1

19. REQUIRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000-if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Eight weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Flight PFPA with Band 4 Ch #16 noise of 2.8 pA. (Ref. FR S8342) Specification is ≤ 2.4pA. Analysis indicates that the Radiometric sensitivity requirements will still be met at the systems level.

24. NEED FOR DEVIATION/WAIVER

The alternative is to take the FPA Assy apart; take Band 4 apart and replace the detector. This operation is risky and since the reason the detector became noisy is unknown, there is no assurance that the replacement detector will perform any better or be more reliable.

REA David M. Randall 2/17/82 SYS ENGR J. P. Engel PE J. Thomas 2/17/82 QA [illegible] 2/18/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 51065 SN 003 ONLY

CMO [illegible] 3-8-82

26. [illegible] AUTHORIZING SIGNATURE: J. P. Engel 2/18/82

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Britt DATE: 2/23/82

ID Form Rev. 1694

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REF. ARK. SOFT. OPERATION 2000
S0904-1 OPERATION 1300

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

FAILURE REPORT

S 8441

1 PART/ASSEMBLY SERIAL NUMBER	2 QTY	3 MODEL	4 TIME OBSERVED	5 DATE OBSERVED
TM PL1162		FLIGHT	2:51 p.m.	MO 11 DA 12 YR 8

6 HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICRO ☐ CARD ☐ PART

ORIGINATOR

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	BAND 1 PRE-AMP	50797	401	SBRC
10. ☐ MODULE ☐ MICRO ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMP 65°C ☐ THERMAL/VAC ____ HRS AT ____ ☐ EMC/EMI ☐ VIBRATION ____ G'S FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: SEE CONTINUATION SHEET (THREE ENTRIES.)

15. DATA SUBMITTED BY: TGS97 | ORG 4461/48 | 16. CHECKED BY: N. C. DAVISON | ORG 2213 | DATE 11/12/81 | 17. CONTINUED ☒ SHEET USED

18. INVESTIGATION AND FAILURE ANALYSIS

19. FAILED ITEM CHANGED AND PART REMOVED

20. ☐ FOLLOWING REWORK/RETEST REQUIRED: Re-response not provided significant trouble. Current cost and time to repair. Re-provide 1 page report.

21. AUTHORIZED BY: [signature] | ORG 2122 | DATE 11/20/81 | ☐ CONTINUED SHEET USED

22. ☐ ADDITIONAL PAGES ATTACHED

23. DISPOSITION: MOVE

24. ☐ DO NOT REPAIR

25. ☐ DO NOT USE

MANUFACTURING AND TEST

26. ALL PARTS REPLACED (PART DESIGNATION)	QTY SYS	PART/LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS REQ

27. REPAIRED BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUED SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: Transient response / Ringing response Non-conformities were due to rebets being stabilized with the ground plane on the upper channel half of substrate. Floating. Transient frequency response was tested when ground plane was attached to ground. See TR 8201 Waiver-123. Allow use of this assy.

30. FRB CLOSURE

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPROVEMENT/CORRECTIVE ACTION: TR 123 (COPY ATTACHED)

33. BASIC CAUSE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET UP ☐ M/O PROCEDURE ☐ ASSY/MFG ERROR ☐ WRK MANSHIP ☐ WRONG PART ☐ WRONG DRAWING ☐ ROUGH HANDLING ☐ WEAR OUT ☐ UNKNOWN

DEFECT CODE

34. FAILURE: ☐ PRIMARY ☐ SECONDARY ☐ NO FAILURE

35. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

36. ENGINEER (NAME)	ORG	DATE	37. SYSTEM ENGINEERING/PROGRAM OFFICE (NAME)	ORG	DATE
[signature]	2122	11/20/81	[signature] for J Boyd	SBRC	12/22

38. RELIABILITY (NAME)	ORG	DATE	39. SYSTEM OR SUPPLIER	DATE
[signature]	5141	12-18-81	D.S.	

REF AIR SOFT OPERATION

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

S8440 FR SERIAL NO. | CONT. SH LETTER: A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL CONTINUATIO SHEET(S) USE

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

14 PER PARAGRAPH 4.6 THE FOLLOWING CHANNELS WERE OUT OF SPEC FOR TRANSIENT RESPONSE SETTLING TIMES:

CH	30 μSec.	60 μSec.	1% BY
1	1.5	1.3	75 μSec
2	1.8	1.0	60 μSec
4	2.0	.8	55 μSec
5	4.0	1.0	35 μSec
7	2.6	.9	33 μSec
9	2.0	.1	33 μSec
10	2.6	.5	35 μSec
11	1.3	1.2	90 μSec
13	1.1	.1	33 μSec
15	2.7	1.5	90 μSec
REQUIREMENT	±1.5%	1.0%	60 μSec

14 PER PARAGRAPH 4.6 THE FOLLOWING CHANNELS WERE OUT OF SPEC FOR FREQUENCY RESPONSE AT THE FOLLOWING POINT

CH	1KHz	2KHz	5KHz	10KHz	20KHz	52KHz	
4	.5	.7	.7	.4		-2.27	d
5	-.2	-.2	-.1	-.4	-.6	-3.01	d
7	.4	.4	.6	.5		-2.39	d
9	.1	.1	.1	-.4	-.96	-3.03	d
8	.4	.5	.6	.5	.3	-2.36	d
10	.5	.5	.5	.2	.1	-2.26	d
12	.3	.4	.6	.4	.2	-2.38	d
14	.3	.4	.6	.4	.1	-2.17	d
16	.3	.3	.6	.6	.5	-2.36	d
PER:	±.5	±.5	±.5	±.5	+.1 -.4	-2.50	

14 PER PARAGRAPH 4.3; CROSSTALK; CH. 2 AVERAGE -3.10 OF NON-NEIGHBORS IS -59 dB; SHOULD BE ≤-60 dB.

16060A SC AUG 78

COPY 1 ROUTE WITH DISCREPANT ITEM

Program Instruction 010 8440

ORIGINAL PAGE IS OF POOR QUALITY

REQUEST FOR DEVIATION/WAIVER (See attachment 2 for instructions)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR (Name and address) David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. CLASSIFICATION OF DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR CODE	c. SYS. DESIG.	d. DEVIATION NO.
F	11323	TM	W-123

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS (INCLUDING GOVERNMENT-FURNISHED EQUIPMENT ITEMS) AFFECTED: [ ] YES [X] NO

7. ITEMS AFFECTED-TEST PLAN

	a. MFR. CODE	b. SPEC. DOC. NO.	c. REV.
a. SYSTEM			
b. TM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

a. MFR. CODE	b. NUMBER	c. REV.	d. NOR. NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER: Permission to use Band 1 Band Level Assy SN 401

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM/IDENTIFICATION: Radiometer

12. CO NO.: 11

13. EFFECT NO.

14. DEVIATION CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 1 Band Level Assy

16. PART NO. OR TYPE SERIES: 50797-E

17. LOT NO.: 401

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100.00-if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Six weeks

22. EFFECT ON INTERFACE, LOGISTIC SUPPORT, INTERCHANGE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Band 1 has a number of channels with transient/frequency response discrepancies as defined by FR 8440. Attached is a copy of FR 8440 and transient response plots for all channels. Channel two has average crosstalk between non-neighbors of -59dB vs a specification of ≤-60dB.

24. NEED FOR DEVIATION/WAIVER

Band 1 has been bonded into the FPA assy and discrepancies are not considered signif: enough to warrant rework on a cost/schedule impact basis.

REA D.M. Randall 11/20/81 SYS ENGR L.E. Ford QA [illegible] PE [illegible]

25. PROPOSED DISPOSITION OF DEVIATION/WAIVER: 003 51065 DEMO ECO'S ONLY

26. [illegible] 11/23/81

27. Minor - System engineering
Major/Critical - Program Manager

28. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

29. SIGNATURE & TITLE: [illegible] DATE 12.17.81

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 3-18-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
S	11323	TM	D-142

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOM. NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER: Permission to use Ag Epoxy Bonds

12. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Short Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797

17. LOT NO.: 501

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Three to Four months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

This deviation requests permission to use Ag epoxy to make the electrical connection on alignment channel A and channels 5, 7 & 15 without making a thermal compression bond first. The bonding area is chipped away on the alignment channel and 5, 7 & 15 have Ag epoxy on their bonding pads which precludes the making of a T.C. bond.

24. NEED FOR DEVIATION/WAIVER

We do not have another basic halfband to replace the present one with the discrepant bonding areas. To rework this halfband or to build another halfband is not considered cost or schedule effective.

REA D M Randall 3/18/82 SYS ENGR J. L. Engel

RE [illegible] 3-18-82

QA [illegible] 3-18-82

PE [illegible]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: Spare

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. L. Engel 3/18/82 TITLE:

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: G. B. Britt for Oscar Weinstein DATE: 3/19/82

DD FORM 1694

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

TO: L. O'Connell

CC: W.D. Adams
L. Altman
G. Gritt
D. Randall
T. Sciacca

DATE: 19 March 1982
REF: HS 236-7901
PE 62:82
FROM: A. Perline

SUBJECT: Use of Silver Epoxy for Electrical Connections (Ref. Deviation D-142)

BLDG. B-11 MAIL STA. 39
EXT. 6106

The undersigned has completed a review of the use of silver epoxy for electrical connections on the spare silicon detector and preamplifier assembly (P/N 50797).

The results are as follows:

1. The bonding will be performed in accordance with SP 60141. Paragraph 6.1 specifies intended use is to achieve electrical conductivity between electrically conductive parts.

2. This bond will be used on three leads only.

3. The wire is 0.001 in diameter and has a loop height of 0.010 in max. The inertia of this loop is extremely small and will pose no problems in vibration. This problem was reviewed at the time of replacement of platinum wires with gold in the CFPA.

A. Perline, Reliability Engineer
Thematic Mapper Program

AP:jc

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS
Don C. Campell
SBRC, 75 Coromar Dr., Goleta CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[ ] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES [X] NO
FLT	11323	TM	D-128				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./COC. NO.	SCN	MFR. CODE	NUMBER	REV.	ADD. NO.
a. SYSTEM	11323	SP80057	D	11323	50797	E	
b. ITEM							
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
AUTHORIZATION TO MODIFY WIRE BOND CONNECTION

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
PRIME FOCAL PLANE DETECTOR ARRAY

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
SILICON DETECTOR

16. PART NO. OR TYPE DESIG.
50803-G

17. LOT NO.:

18. QTY
1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
$20,000

21. EFFECT ON DELIVERY SCHEDULE
2 Weeks

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER
THIS DEVIATION REQUESTS PERMISSION TO DISCONNECT SILICON DETECTOR, CHANNEL #9 DETECTOR LEAD AT THE DETECTOR LEAD TO DETECTOR SUBSTRATE CONNECTION OF #50797 BAND 3 S/N 401. TEST FOR WIDEBAND NOISE CHARACTERISTICS (DETECTOR OUT OF CIRCUIT), ~~RECONNECT CHANNEL #9 DETECTOR LEAD AT THE CRYOGENIC SLEEVE DOWN TO THE CARRIER AT THE SPECIAL WIRE BOND SITE~~ per TWX JLC DR (ECF)

24. NEED FOR DEVIATION/WAIVER
NOISE MEASUREMENTS MADE ON CHANNEL 9 OF #50797 BAND 3 S/N 401 INDICATED A POTENTIAL EXCESS NOISE CONDITION WHICH COULD AFFECT FINAL SYSTEM PERFORMANCE. THIS ACTION IS NECESSARY TO ACCURATELY DETERMINE THE SOURCE OF NOISE AND ITS EFFECT ON FOCAL PLANE PERFORMANCE.

REA _____ SYS ENG _____ R.E. _____ QA _____ P.E. _____ 15 Oct 81 CHD _____ 10-20-81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SERNO 003 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE _____ TITLE _____

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY _____ SIGNATURE _____ DATE _____

DD FORM 1694 | Engineering | Reliability | Quality | Production | Test

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 10/19/81

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: D.M. Randall
SBRC, 75 Coromar Dr. Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323		W-112

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	50795	H	-

9. TITLE OF DEVIATION/WAIVER: Permission to continue thru FPA assy 50795 with Band 3 Ch 9 Wide Band Noise of 2.9 pA.

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II
13. DEFECT NO.:
14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 3 Band Level Assy
16. PART NO. OR TYPE DESIG.: 50797-E
17. LOT NO.: 401
18. QTY: 1
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: $45,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: Two weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to reconnect detector lead Band 3 Ch #9 via silver epoxy, test and assembla into F-1 PFPA assy 50795 with Ch 9 wide band noise of 2.9 pA.

24. NEED FOR DEVIATION/WAIVER

The alternative is to take the band level assy apart and replace the detector array. This operation is risky and since the reason the detector became noisy is unknown, there is no assurance that replacing the detector will result in better performance or reliability

REA D.M. Randall 10/19/81 SYS ENGR J.L. Engel

RE

QA 10/19/81

PE R.T. Williams 10/19/81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 003 51065 SN 003 only

CMO

26. NAME OF ORIGINATING ACTIVITY REPRESENTATIVE AUTHORIZING SIGNATURE: J.L. Engel 81019

TITLE: Minor - System Engineer
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

b. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Britt DATE: 10/30/81

DD FORM 1694

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HUGHES

INTERDEPARTMENTAL CORRESPONDENCE

TO: R. J. Wilkerson
ORG. 51-41

CC: L. C. Long
J. H. Kaffer
L. O'Connell

DATE: 15 October 1981
REF. 7621.21/276

SUBJECT: Bonding of Gold Wire

FROM: K. H. Boyle
ORG. 76-21-21

BLDG. 376 MAIL STA. R1
LOC. CO EXT. 52

A recent problem when bonding a 1 mil gold wire to gold plated quartz has resulted in an electrically noisy bond joint. It has been suggested that the silver-filled epoxy used in accordance with SM 80140 be mechanically removed and fresh epoxy applied to form a better bond. Because of the small surface area involved and the thinness of the wire, it would be difficult to completely remove all of the cured epoxy. Questions arose as to the integrity of such a secondary bond on top of a cured adhesive.

In this instance, there should be no problems with this bonded joint. The only load on the wire is its weight. The bondline will be mainly an epoxy/epoxy coupling as opposed to an optimum epoxy/gold bond. However, this mechanical bond should be adequate for this application.

There may be some degradation in the thermal transfer capabilities, but it is doubtful that it could be measured. This rework procedure is strictly recommended for this problem and should not be used in general practice.

K. H. Boyle

D. T. Chun, Head
Adhesives and Dielectrics Section

/cs

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W 114

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50795	H	-

9. TITLE OF DEVIATION/WAIVER
Permission to proceed with Band 4 Ch #16 noise of 2.8 pA

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band 4 Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797-E

17. LOT NO.: 401

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
$80,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE
Four weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
This waiver requests permission to proceed with assy. and testing up to completion of the Flight PFPA with Band 4 Ch #16 noise of 2.8 pA.

24. NEED FOR DEVIATION/WAIVER
The alternative is to take Bands 3 and 4 out of the FPA Assy; take Band 4 apart and replace the detector. This operation is risky and since the reason the detector became noisy is unknown, there is no assurance that the replacement detector will perform any better or be more reliable.

10/29/81

10/28/81 D M Randall REA SYS ENGR L L Engel PE Lionel D Blumer

RE

QA 10/28/81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 5\065 SV 003 & SUBQ

26. L L Engel 10/28/81

27. Minor - System Engineering
Major/Critical - Program Manager

28. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

29. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Scott DATE: 10/29/81

DD FORM 1694

Program Instruction DICQ

H 50

DATE SUBMITTED: 11-10-81

PX

1. ORIGINATOR: David M. Kunkee

SSRC, 75 Coromar Drive, Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. CLASSIFICATION OF DEV/WAIVER

a. MODEL TYPE	b. WBS CODE	c. SYS. DESIG.	d. DEVIATION NO.
F	11323	IM	W-115

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. ITEMS FROM THE APPROVED TEST PLAN

	WBS CODE	SPEC. DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

WBS CODE	NUMBER	REV.	MOD. NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER: Permission to use Band 2 Band Level Assy SN 401

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. IDENTIFICATION OF NONCONFORMANCE: Radiometer

12. ITEM NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR COMPONENT AFFECTED: Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797

17. LOT NO.: 401

18. QTY:

19. ACCORDING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000 - if not approved

21. EFFECT ON DELIVERY SCHEDULE: 3 to 4 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 2 Band Level Assy SN 401 with Ch 1, 5, 9 & 13 not meeting frequency response of ≥-3dB @ 52KHZ (-3.1dB, -3.05uB & -3.06dB respectively); Ch 5, 7 & 9 have non-neighbor crosstalk of -59dB, -59dB & -58dB respectively vs a spec of ≤60dB; and Ch 2, 6, 7, 8, 9, 11, 12 & 13 do not meet settling time requirements. Copy of FR 6324 attached.

24. NEED FOR DEVIATION/WAIVER

The rework required to correct the discrepancies noted above is not considered cost or schedule effective.

REA [signature] SYS ENGR [signature] RE [signature] 11/24/81

QA [signature] PE [signature]

25. PROPOSED EFFECTIVE DATE OR ITEM NO.: 003

[signature] 11/16/81

Minor - System Engineering
Major/Critical - Program Manager

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

[signature] DATE 12-17-81

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR AR 702 FOR INSTRUCTIONS)

DATE PREPARED: 11-10-81

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Drive, Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. CONFIGURATION	b. WORK UNIT CODE	c. SPEC. SECTION	d. DEVIATION/WAIVER NO.
F	11323	TM	W-116

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. CI(S) OR CONFIGURATION ITEMS AFFECTED BY TEST PLAN

a. SYSTEM	b. WORK UNIT CODE	c. CI NO.
a. SYSTEM		
b. CI		
c. TEST PLAN		

8. DRAWINGS AFFECTED

a. WORK UNIT CODE	b. NUMBER	c. REV.	d. SUB. NO.
11323	50797	E	-

9. TITLE OF DEVIATION/WAIVER: Permission to use Band 3 Band Level Assys SN 201

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. IDENTIFICATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. SAFETY NO.:

14. DEVIATION CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR HIGHER ASSEMBLY AFFECTED: Band Level Assy

16. PART NO. OR TYPE DESIG.: 50797

17. LOT NO.: 201

18. QTY: 1

19. PRECEDING DEVIATIONS/WAIVED: [ ] YES [X] NO

20. EFFECT ON COST/FEE-CC: Greater than $100,000-if not approved.

21. EFFECT ON DELIVERY SCHEDULE: 3 to 4 months if not approved

22. EFFECT ON INTERCHANGEABILITY, SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 3 Band Level Assy SN 201 with Ch 4 noise of 2.6 pA and Ch 9 noise of 2.9 pA vs a spec of <2.4 pA and Channels 1, 2, 3, 4, 6, 8, 10, 12, 14, 15 & 16 not meeting transient response settling time requirement of ≤1.5% by 30 ms. Copy of FR 8317 attached.

24. NEED FOR DEVIATION/WAIVER

Noise performance of Ch 4 & 9 will still allow system signal to noise performance to be met and all channels have transient responses that settle to 1% by ≤60ms. The rework required to correct the discrepancies described above is not considered cost or schedule effective.

REA: [signature] SYS ENGR: [signature] ME: [signature] QA: [signature] PE: [signature]

25. PRODUCTION EFFECTIVITY OR SERIAL NUMBERS: 003

26. APPROVAL AUTHORITY: [signature] 11/16/81

Minor - System Engineering
Major/Critical - Program Manager

27. [ ] APPROVAL RECOMMENDED

28. [X] APPROVED [ ] DISAPPROVED

29. NAME AND TITLE: [signature] DATE: 12-17-81

DD FORM 1694

H 5

Program Instruction 018

REQUEST FOR DEVIATION/WAIVER
(USE MIL-STD-480 OR MIL FOR INSTRUCTIONS)

DATE PREPARED: 11-10-81

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SSRC, 75 Coromar Dr. Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DES CRIPTION FOR DEVIATION/WAIVER

4a. MODIFIER	4b. MFR CODE	4c. SYS DESIG	4d. SPECIFIED ON
Y	11323	TM	W-117

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEM/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED/TEST PLAN

	MFR CODE	SPEC/DOC NO.	DOC
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

	NUMBER	REV.	NUMBER
	11323 50797	E	-

9. TITLE OF DEVIATION/WAIVER
Permission to use Band 4 Band Level Assy SN 201

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

12. CD NO. II

13. SAFETY NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF ITEM OF LOWEST ASSEMBLY AFFECTED
Band Level Assy

16. PART NO. OR TYPE DESIG.
50797

17. LOT NO.
201

18. SERIAL NO.
1

19. [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $100,000-if not approved.

21. EFFECT ON DELIVERY SCHEDULE
Three to four months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACES, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 4 Band Level Assy SN 201 with Channels 5, 13, 14 15 & 16 exceeding transient response settling time specification, and Channels 1, 5, 9, 13 & 15 have -58dB crosstalk vs a specification of -60dB.

Channel	30µs	60µs	1% by
5	2.0%	1.0%	60us
13	2.0	2.0	90us
14	2.0	.8	50us
15	2.0	.5	33µs
16	1.9	0	32us

24. NEED FOR DEVIATION/WAIVER

The rework required to correct the discrepancies noted above is not considered cost or schedule effective.

REA [signature] SYS ENGR [signature]

RE [signature] 11/16/81
QA [signature] 11/16/81
PE [signature] 11/16/81

25. REVISION OR REFERENCE DOCUMENT NUMBER
003

26. [signature] 11/16/81

Minor - System Engineering
Major/Critical - Program Manager

27. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

28. SIGNATURE [signature] DATE 12.17.81

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED 12/1/81

PROCURING ACTIVITY

1. ORIGINATOR NAME AND ADDRESS: David M. Kendall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITIC

4. DESIGNATION FOR DEV OR WAIVER

a. MODEL TYPE	b. MFR. CODE	c. SYS DESIG	d. SERIAL NO.
F	11323	TM	W-119

5. BASE LINE AFFECTED: [X] FUNC. [ ] ALLOC. [ ] PROD.

6. OTHER SYSTEM/CONFIG ITEMS AFFECTED: [ ] YES [X] NO

7. ITEM IDENTIFICATION AFFECTED-TEST PLAN

	a. MFR. CODE	b. SPEC. NO.	c. REV.
a. NOMEN			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

a. MFR. CODE	b. NUMBER	c. REV.	d. SUB. NO.
11323	51015	D	2950-A

9. TITLE OF DEV APPLICABILITY
Permission to use Halfband SN 207-1

10. CONTRACT NO. & LINE #
NAS 5-24200

11. IDENTIFICATION ITEM NOMENCLATURE
Radiometer

12. CD NO. II

13. SERIAL NO.

14. DEFECT CLASSIFICATION: [ ] MINOR [X] MAJOR [ ] CRITIC.

15. NAME OF PRIME OR HIGHER ASSEMBLY AFFECTED
51015

16. SERIAL NO. OR TYPE SERIES

17. LOT NO. 207-1

18. QTY 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST
Greater than $100,00 if not approved

21. EFFECT ON DELIVERY SCHEDULE
Greater than 4 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC
None

23. DESCRIPTION OF DEVIATION/WAIVER
Permission to use Halfband SN 207-1 with transient response matching to 1.05% by 60 usec on channel 3 vs a specification of ±1.0% by 60 usec.

24. REASON FOR DEVIATION/WAIVER
This unit had been reworked a number of times and this was the best result. Halfband has since been assembled into Band 2 Band Level Assy. Rework at this time is not considered cost or schedule effective.

REL [signature] 11/16/81 SYS ENGR [signature] 11/17/81 QA [signature] 11-5-81 PE [signature]

25. APPLICATION (EFFECTIVITY BY SERIAL NUMBER)
003

26. [signature] 11/18/81
Minor - System Engineering
Major/Critical - Program Manager

27. [ ] SPECIAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

28. [signature] DATE 12-7-81

DD FORM 1694

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OF POOR QUALITY

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED 11/12/81

PROCURING ACTIVITY NO. 1 + 6

1. ORIGINATOR NAME AND ADDRESS David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [V] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES [X] NO
F	11323	1M	W-120				

	7. SPECIFICATIONS AFFECTED-TEST PLAN			8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM							
b. ITEM				11323	50904-4	G	-
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Permission to use Band 4 Postamp SN 201

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF EFFECT

12. CD NO. II | 13. DEFECT NO | 14. DEFECT CLASSIFICATION [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Band 4 Postamplifier

16. PART NO. OR TYPE DESIG.
50904-4

17. LOT NO.
201

18. QTY
1

19. RECURRING DEVIATION/WAIVER [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None if approved.

21. EFFECT ON DELIVERY SCHEDULE
None if approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Band 4 Postamp with Ch 6 frequency response -2.24 dB down vs a specifiation of -2.5 to -3.0 dB down at 52KHZ.

24. NEED FOR DEVIATION/WAIVER

This parameter is in violation of a unit level specification; not a system specification. Rework to the Postamp PWB may result in a lifted pad. The Band 4 Band Level Assy has been bonded into LED bracket and can no longer be cooled to allow reselection of resistors. Rework is not considered necessary since Wide Band Noise of Channel 6 is 2.1pA.

REA 11/17/81 SYS ENGR for J Engel 11/17/81 QA 11/17/81 PE 11-18-81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. APPROVING ACTIVITY SIGNATURE for J Engel
TITLE Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

28. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE Kenneth B. Erickson DATE 11/20/81

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 1

1. ORIGINATOR NAME AND ADDRESS
DAVID M. RANDALL
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-126

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	SUP. NO.
11323	50795	H	-

9. TITLE OF DEVIATION/WAIVER
Permission to use PFPA with Band 1 misaligned.

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II | 13. DEFECT NO | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Si Focal Plane Assy
16. PART NO. OR TYPE DESIG.: 50795
17. LOT NO.: 003
18. QTY: 1
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $50,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE
Four weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
Misalignment must be taken into consideration.

23. DESCRIPTION OF DEVIATION/WAIVER

Band 1 is located .102961 "to .102977" from Band 2 in the "Y" dimension vs a drawing requirement of .10200" ± .000150". This will result in a misregistration of .24 IFOV; this misregistration will have to be taken in to consideration by ground processing of TM data.

24. NEED FOR DEVIATION/WAIVER

To correct this misregistration will require the removal and realignment of Band 1 Band Level Assy. This is a difficult and risky operation. It is not considered cost or schedule effective to repair.

REA D M Randall 12/15/81 SYS ENGR J L Engel PE

RE

QA

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 51065 SN 003 ONLY

26. [illegible] SIGNATURE: F K Hilliam
TITLE: Minor - System Engineering Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [X] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: Landsat D - TM
SIGNATURE: [illegible]
DATE

DD FORM 1694

T.F.S 12/17/81
CCR #0335

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: 3-10-82

PROCURING ACTIVITY NO.: F

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F-1	11323	TM	W-143

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [X] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	52733	C	ES 394LA

9. TITLE OF DEVIATION/WAIVER
No planning for EO 8842 - Baffle Assy

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Thematic Mapper Assembly

CLASSIFICATION OF DEFECT

12. CD NO. | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
Baffle Assembly	52733 -C		1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE
2 weeks if disapproved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

There exists no planning to incorporate EO 8842. This EO invokes the same changes as EO 8181 (superseded by EO 8842) but adds clarifying notes to provide specific clearances enabling assembly at the next higher level, adds the marking specification number to the drawing, and adds a requirement for bonding material test specimens.

EO 8181 has been covered by planning, and incorporated into the F-1 hardware. Even though the added notes for clearance were not invoked on the planning, their intent was accomplished as evidenced by the ability to have installed the Baffle Assembly into its next assembly.

QA records show hardness test data for the bonding material, although the test was not referenced in the planning.

24. NEED FOR DEVIATION/WAIVER

The hardware has been built to the full intent of EO 8842, even though the planning did not specifically call out that EO. The records show that the Baffle Assembly is suitable for flight use.

RE: W Belinski SYS ENGR: J L Engel
QA: [illegible] 3/10/82
PE: [illegible] 3/10/82
CMC: [illegible] 3/11/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 only

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J L Engel 3/10/82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: George R. Lutz
DATE: 3/11/82

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 27 March 1982

PROCURING ACTIVITY NO.: 8

1. ORIGINATOR NAME AND ADDRESS:
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight	11323	TM	W-148

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM	11323	TP32015-506	Rev D
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.

9. TITLE OF DEVIATION/WAIVER: Waiver on tolerance of Prime Focal Plane to scan direction alignment

10. CONTRACT NO. & LINE ITEM: NAS-5 2400

11. CONFIGURATION ITEM NOMENCLATURE: IA06R test

CLASSIFICATION OF DEFECT

12. CD NO.: | 13. DEFECT NO.: | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
IA06R test	52532	N/A	1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE: None

21. EFFECT ON DELIVERY SCHEDULE: None

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Scan direction to prime focal plane array angle is 0.74mrad. The IA06 test procedu targets ±0.5mrad. [Paragraphs 1.1 and 5.1.14]

This deviation will not affect our ability to meet the relevant system level specifications on band to band registration. An angle of 0.74mrad corrosponds to an along track BBR error of 0.06 IFOV between bands 1 and 4 (spec. is ±0.2IFOV) and 0.12 between bands 1 and 5 (spec. is ±0.3 IFOV).

24. NEED FOR DEVIATION/WAIVER

Avoid schedule delay and risks involved in rotating optical assembly.

RE [signature] for J Engel 3-27
QA [signature]
PE [signature] for L Allen
REP [signature] for A Alves SYS ENGR [signature] for J Engel

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature] for J Engel
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [✓] APPROVED [ ] DISAPPROVED
c. GOVERNMENT ACTIVITY
SIGNATURE [signature] DATE

DD FORM 1694

Rec'd Waiver 3/27/82

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OF POOR QUALITY

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: 5/10/82

PROCURING ACTIVITY NO.: H&P

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [ ] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-154

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50797	E	

9. TITLE OF DEVIATION/WAIVER: Permission to Use Band Level Assy SN 501-2

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.: II
13. DEFECT NO.:
14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Band Level Assy
16. PART NO. OR TYPE DESIG.: 50797-E
17. LOT NO.: 501
18. QTY: 1
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: None if approved

21. EFFECT ON DELIVERY SCHEDULE: None if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Band Level Assy SN 501 has out of specification transient responses for Ch 1, 8, 10 and 14 per FR 8211. A copy of the FR and transient responce plots are attached.

24. NEED FOR DEVIATION/WAIVER

The Band Level Assy is completed and would require a high degree of risk to the quartz substrates to take apart to rework. The $15K Si detector would have to be replaced and there is no guarantee that rework would result in better performance. Rework is not considered cost effective.

5/10/82
REA D.M. Randall SYS ENGR 5-3-82 PE

RE 5-13-
QA 5-3-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
004 5106S SN 004 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: F.W. Sullivan
TITLE: Program Manager

27. APPROVAL DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY | SIGNATURE | DATE

DD FORM 1694

FAILURE REPORT

S 8211

EL SEGUNDO, CALIFORNIA

ORIGINATOR

1. PART NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
PC 1162 TM		SPARE	FIRST SHIFT	MO 04 DA 28 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY		50797-2	501	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP °/° ☐ THERMAL VAC HRS AT °/° AXIS FOR MIN TYP? ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 15 NO RESPONSE, D.C. OFFSET IS ADJUSTABLE, HIGH NOISE WITH 1/2 NOISE EVIDENT. CH. 1, 8, 14, 10 OUT OF SPEC ON TRANSIENT RESP. AFTER 30 μS. CH. 14, 1 OUT AT 60 μS.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16306	4.6	C. P. Lowe	22-13	04-28-82	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Apply Waiver 3022 apply to trace of Ch 15 making sure "non-incorrect" data is used and ensure "non-incorrect" data is covered per the waiver.

21. AUTHORIZATION: [signature] ORG 2121 DATE 4/29/82 ☐ 22. CONTINUATION SHEET USED

MANUFACTURING AND QUALITY

23. REWORK/RETEST ACTION TAKEN: This approval and Ch 15 tested good. No corrective of any components required. 24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause of poor electrical contact on Ch 15 is unknown. Ref. Waiver 154 for disposition of Ch 1, 8, 10 & 14

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE

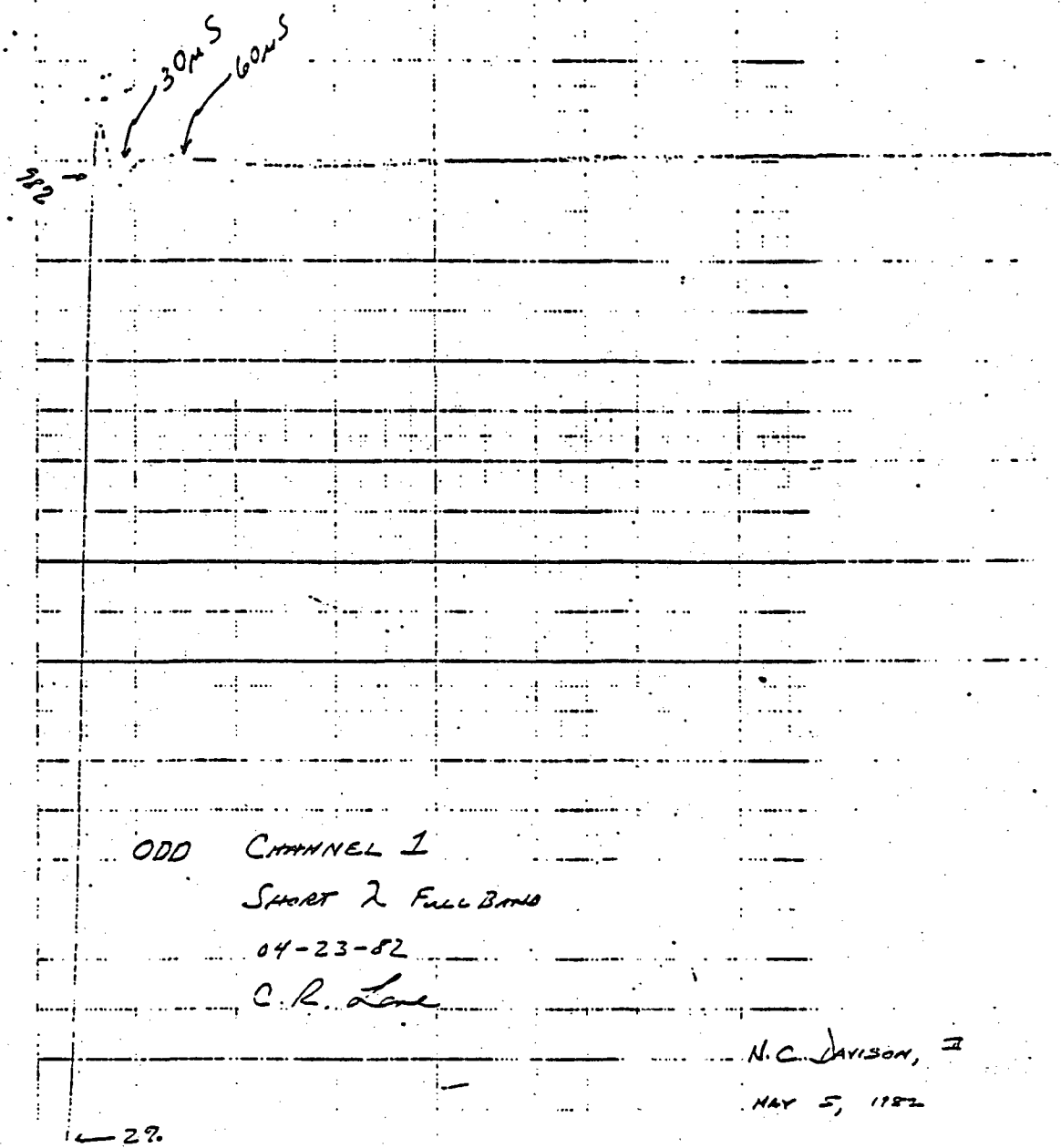
34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/F&B ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

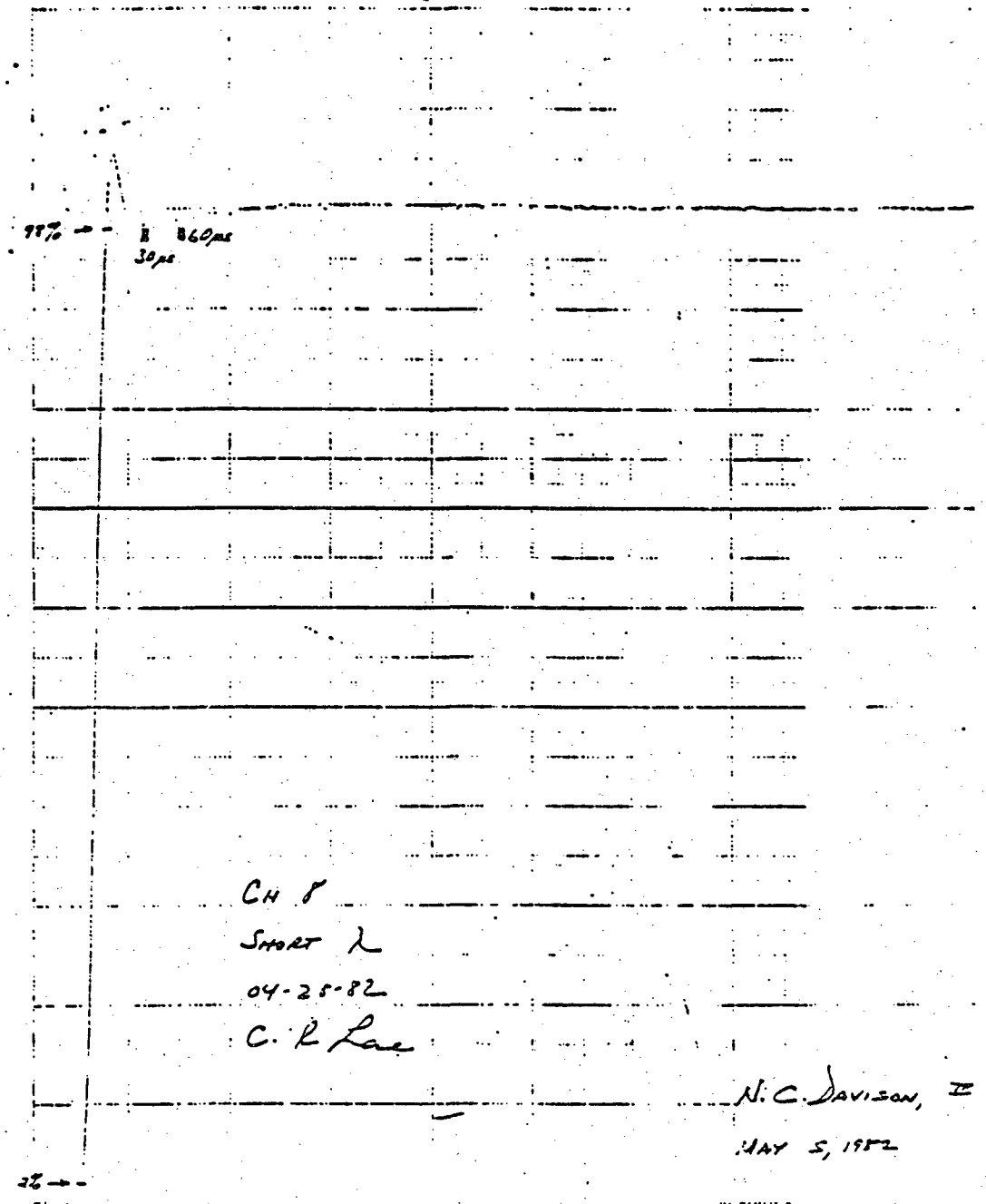
35. FAILURE TYPE? ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

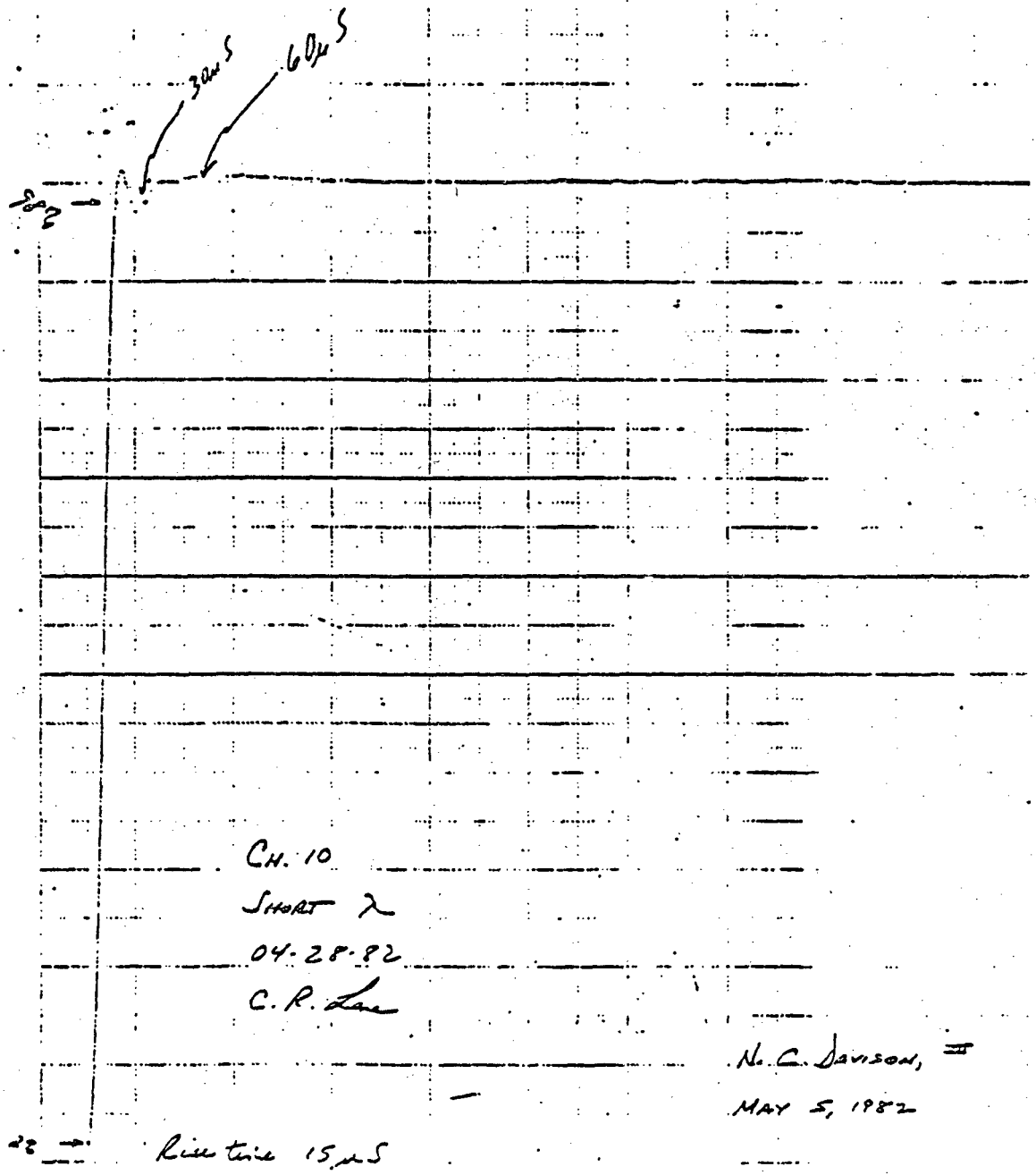
37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	5/10/82			

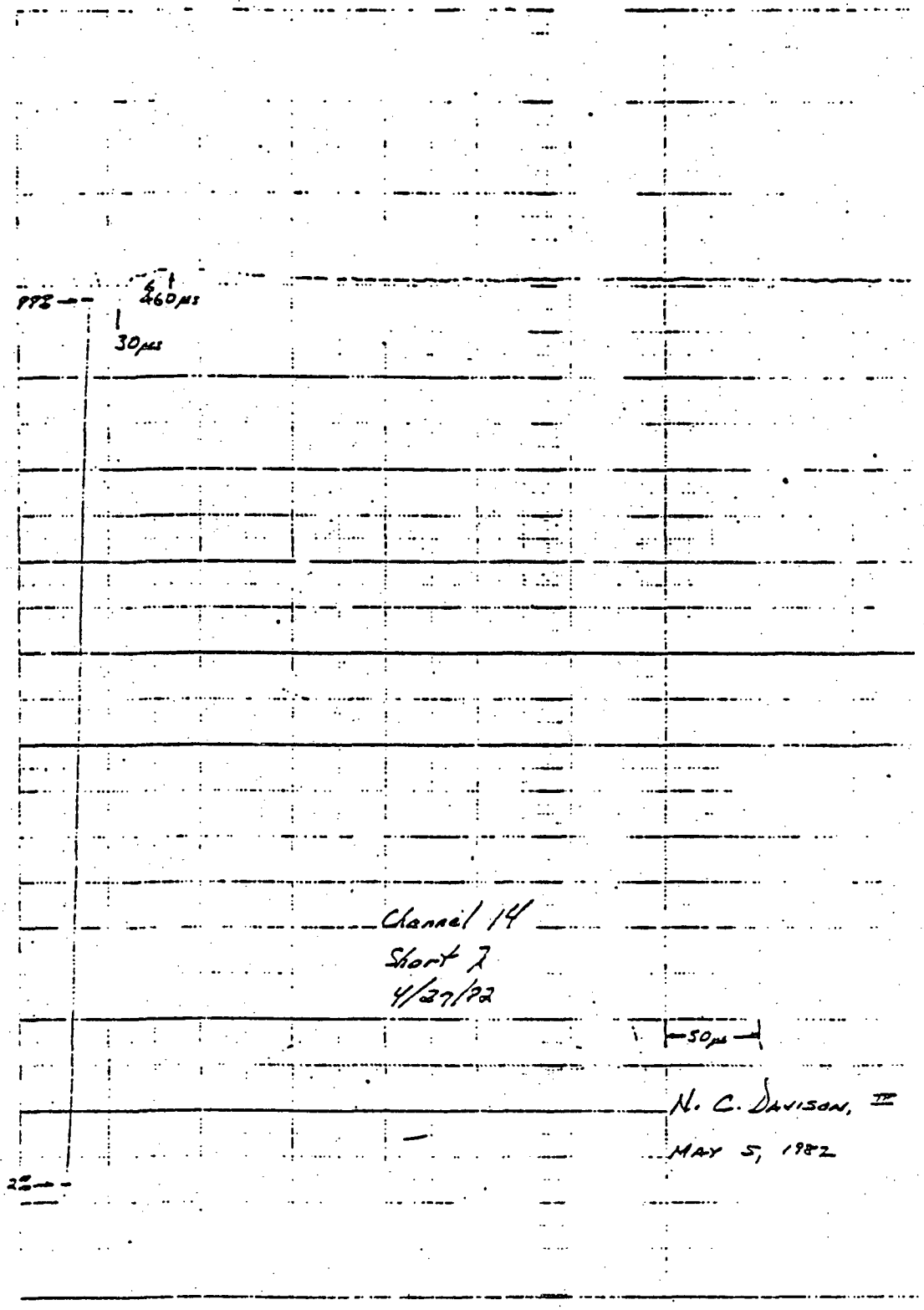
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE

1875 SC JAN 80









SBRC

SPARES

ASSEMBLY HISTORY RECORD SUPPLEMENT

SHEET 1 OF 1

PART NUMBER	SERIAL OR LOT NUMBER	DRAWING NO.	DRAWING REVISION	MFR SYMBOL CODE	PREPARED BY	SUPPLEMENT NO. 2 10
50797-2	501	50797	E	21-23	J. Wells	AHR DATED 4/15/81

ASSEMBLY NAME: SILICON DETECTOR PREAMP ASSY

APPLICABLE ECOs:

RESP ENG APPROVAL:

QUALITY APPROVAL:

PRODUCTION APPROVAL:

PROJECT APPROVAL:

OTHER:

SUPPLEMENT RELEASE DATE 3/29/82

NOTE TO PRODUCTION - UPON RECEIPT, ENTER SUPPLEMENT NO. AND RECEIPT DATE ON FRONT SHEET OF AHR. INITIAL THE ENTRY.

PURPOSE OF SUPPLEMENT - INCORPORATES NEW ASSY DWG REVISION (1) OR ECO (2) REWORK (3) OTHER (4) EXPLAIN:

ADDITIONAL TESTING PER R.E.A.

NOTES: 1) Same as original AHR.
2) Reason for this test is to ensure that band level assy is functionalable prior to putting assy. into project stores incomplete.
3) Postamp PWB not available for testing with band level assy.

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
2601	22-1	1) Notify Q.A. & A.F. before testing	CRL		04/22/82	
		Q.A. (1/112) & A.F. 4/22 PBR NOTIFIED PER TELECON				
					11/29/82	TRANSFERRED TO AHR 2602.
		2) Test per spec #16306 Rev J & EO's 3864A, 3944A &				
		3047A.				
		*NOTE: Attach all test data to AHR.				
2602	51-1	Inspection verify test data from oper. #2601 Step #2.			11/29/82	FIG 8 211 COMMITMENT
		...:RETURN TO MAIN AHR OPERATION #2700				

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4.5 Response for each focal plane channel at the following frequencies:

	1 kHz	2 kHz	5 kHz	10 kHz
Ch 1	-.3 db	-1.0 db	-3.7 db	-8.1 db
23	-.3	-.8	-3.5	-7.8
35	-.3	-1.0	-3.9	-8.3
47	-.2	-.8	-3.7	-7.9
59	.01	-.1	-.9	-3.3
611	-.2	-.8	-3.3	-7.4
713	-.2	-.8	-3.3	-7.4
815				

	20 kHz	50 kHz
Ch 21	-13.7 db	-22.1 db
23	-13.4	-21.5
35	-13.8	-21.8
47	-13.6	-21.4
59	-7.9	-16.2
611	-12.6	-20.2
713	-12.8	-20.9 *
815		

Test Engineer C.R. Lau

Date 04-28-82

Design Engineer _____

Date _____

Q.A. Engineer _____

Date _____

*FR 8211

SIZE	CODE IDENT NO	NUMBER
A	11323	16306
SCALE	REV	SHEET 9

PART NO.			PART NAME	ASSY/LOT SERIAL NO.	QTY	
OPER NO.	DATE	OPERATOR OR INSP	COMMENTS, TEST DATA, ETC	DISPOSITION	APPROVAL	
SUPPLY 1760	1/12/82		VOIDS IN SILVER EPOXY ON CH 7 TRACE	Repair per Insp.		TELE 1/15/82
	4/12/82		1. Apply silver epoxy to trace of Ch 7 making sure "new" uncovered trace is incl, and cover upto and including "new" part of wire. Mfg # 12-17-81-1 Cure Temp. 70°C Time 3 hrs.	SP 80141 REV C		TELE 4/15/82
SUPPLY 2662	4/29/82		FR 82 11. CH 15 NO RESIDUE O.C. OFFSET IS HAD ASTABLE HIGH NOISE WITH I/P NOISE EVIDENT. CH 1, 14, 15 OUT OF SPEC ON HARRIS PROGRAMMER 22 n.s. CH 1, 14 OUT AT 60 HZ			
	4/30/82		(Waldman 3022) per 1. Apply silver epoxy to trace of	FR 82 11 INVESTIGATION		4/30/82
	5/2/82		Ch 15 making sure new uncovered trace is incl over upto and including new part of wire. Mfg # 12-17-81-1 Cure Temp 70°C Time 2 hrs			
	05/04/82	CRE	2. Test Ch 15 per 76806			4/3/82

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REVISIONS

SYM	DESCRIPTION	DATE	APPR
	INITIALLY RELEASED 9-5-78		
FIRST USE	D	Completely revised and retyped to incorporate new system specs & update test procedures. As required by ECR TM1103/01.	12-6-79	
SER. No. 002 & SUBQ.	E	Incorporated EO 1610	80-8-29	
51065 SER. No 002 & Subq.	F	Paragraph 4.6 added: Transient response---- gold wires are not damaged. as req by ECR TM 1913/01.	80-09-12	
51065 S/N CC3 & SUBQ.	G	Incorporated E. O. 2149A	12-2-80	
51065 S/N 003 & SUBQ	H	INCORPORATED EO 2960A.	81-4-20	
51065 S/N 003 & SUBQ	J	Changed by Revision Notice per ECR No. TM 2339/01	81-5-22	

RETEST ON CHIP SEN

PER COMMENT SHEET #4, DP. No. 2 OF 30 APRIL 82 Ref F/R #8211

SEE EO 3961A

CONTRACT NO. NAS 5-24200

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
GOLETA, CALIFORNIA

PREPARED | CHECKED | APPROVED

TITLE
TEST PROCEDURE
FOCAL PLANE PREAMP ASSEMBLY

SIZE	CODE IDENT NO.	NUMBER
A	11323	16306

SCALE | SHEET 1 OF 12

4.5 Response for each focal plane channel at the following frequencies:

	1 kHz	2 kHz	5 kHz	10 kHz
Ch 1	_____ db	_____ db	_____ db	_____ db
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
P15	-.3	-1.0	-4.0	-8.4

	20 kHz	30 kHz
Ch 1	_____ db	_____ db
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
P15	-13.9	-21.9

Test Engineer C. R. Lee

Date 05-04-82

Design Engineer _____

Date _____

(1/116) VERIFY CH#5 DATA COMPLETE

A.A. Engineer Ray Rumas ✓

Date 5/4/82

SIZE	CODE IDENT NO	NUMBER
A	11323	16326

SCALE | REV J | SHEET 9

4.6 Boosted Frequency Response:

	100 Hz Limits (db)	1 kHz ±0.5	2 kHz ±0.5	5 kHz ±0.5
Ch 1	_____ db	_____ db	_____ db	_____ db
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
815	0	-.1	-.1	.04

	10 kHz Limits (db) +0.4 -0.6	20 kHz +0.1 -0.9	52 kHz ≥ -3
Ch 1	_____ db	_____ db	_____ db
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
815	.1	.1	-2.9

Test Engineer C. R. Lee Date 05-04-82

Design Engineer _____ Date _____

Q.A. Engineer ACCEPT CH 1-5 Date 5/4/82

SIZE	CODE IDENT NO	DWG NO	REV
A	11323	16306	
SCALE		SHEET	10

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4.5 Transient Response

Maximum excursion from final value after time $t_0 + t$ where t_0 is the time when the response reaches 2% of final value.

	t = 35uS (30 Equivalent Pole) Limit = 1.5%	t = 60uS Limit = 1.0%
Ch 1		
2		
3		
4		
5		
6		
7		
8 15	.50%	.5%

OVERSHOOT Limit: 10%

CH 1		5	
2		6	
3		7	
4		15 2.2%	

STIME

CH 1		Limit: 20 uS
2		Test Engineer C. L. Lew
3		Date 05-04-92
4		Design Engineer
5		Date
6		Q.A. Engineer (1/116) Accept CH 15 Ray Ruiz
7		Date 5/4/92
8 15	14.0 uS	

SIZE	CODE IDENT NO	DRAWING
A	11323	16306

SCALE | REV J | SHEET 11

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4.7 Wideband noise

Ch	Meter	Gain*	Pre-Amp Output	r.m.s. Noise	R_{FB}
1.	____V	____	____mV	____pA	
2.	____	____	____	____	
3.	____	____	____	____	
4.	____	____	____	____	
5.	____	____	____	____	
6.	____	____	____	____	
7.	____	____	____	____	
4.15.	.83	378	2.20	2.1	$1.05 \times 10^9 \Omega$

* = Post Amp Gain [illegible]

Gain = Main Gain [illegible]

Conversion Factor [illegible]

$$\text{Gain} = \left\{\left[\frac{7.13}{\text{[illegible]}} - \frac{(-16.03)}{\text{[illegible]}} + \frac{28.39}{\text{[illegible]}}\right]\right\} \frac{1}{\text{[illegible]}} = 378$$

Design Engineer _____ Date: _____

TEST Engineer C. R. Lane Date: 05-04-92

Q.A. [illegible] Date: 5/4/92

C-2

SIZE	CODE IDENT NO	NUMBER
A	11323	10705
SCALE	REV	SHEET 12

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED 5/

PROCURING ACTIVITY NO. H-P

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-155

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CIA/FIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50797	E	—

9. TITLE OF DEVIATION/WAIVER
Permission to use band level assembly S/N 501-1

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF EFFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Band Level Assy.

16. PART NO. OR TYPE DESIG.
50797-E

17. LOT NO. 501

18. QTY 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None if approved

21. EFFECT ON DELIVERY SCHEDULE
None if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

Band level assy. S/N 501 has out of specification transient responses for Ch 1, 5 7 and 15 per FR 8212. A copy of the FR and transient response plots are attached.

24. NEED FOR DEVIATION/WAIVER

The band level assy. is completed and would require a high degree of risk to the quartz substrates to take apart to rework. The $15K Si detector would have to be replaced and there is no guarantee that rework would result in better performance. Rework is not considered cost effective.

5/11/92
REA D.M. Randall SYS ENGR [illegible] 5-13-92 PE [illegible] 5-13-92 FEL Mgr.

RE [illegible] 5-13-92
QA [illegible] 5-13-92

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
5106 SN 004 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE [illegible] Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY | SIGNATURE | DATE

DD Form 1694

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HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8212

ORIGINATOR

1. PROGRAM NAME AND NUMBER: PL 1162 TM | 2. GLA | 3. MODEL: SPACE | 4. TIME OBSERVED: FIRST SHIFT | 5. DATE OBSERVED: MO 05 DA 03 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY		50797-1	501	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ ☐ ACCEPTANCE ☐ SYSTEM ☐ ☐ REPROCESS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ EMC/RI ☐ VIBRATION ____ AXIS FOR ____ HRS TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 1, 5, 7, 15 OUT OF SPEC. TRANS. RESP. AFTER 30 μS. CH. 9, 13 OUT OF SPEC. TRANS. RESP. AFTER 60 μS. HALF BAND 210 (ODD) SHOWS 10.9 dB SHORT J1-16 TO J1-11 SHOULD BE > MR. HALFBAND 211-1; 10dB SHORT J1-16.

15. TEST PROCEDURE: CR-LG-16306 | PARA: 4.6.4.8 | 16. ORIGINATOR: C. R. Lane | ORG: 22-13 | DATE: 05-03-82 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: J-1-16 to J-1-11 resistance reading out of spec. due to measurements being made with shorting connectors on other feedthroughs

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Retest without shorting connectors.

21. AUTHORIZATION: [signature] | ORG: 21-21 | DATE: 5/7/82 | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Retested in spec. when shorting connectors are out. No evidence of long conductor resonance. | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Test operator switched body lead shorting connector in the halfband during test. Ref. LF-155 for disposition of CRs 1, 5, 7, 15.

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION | 33. FAB CLOSURE

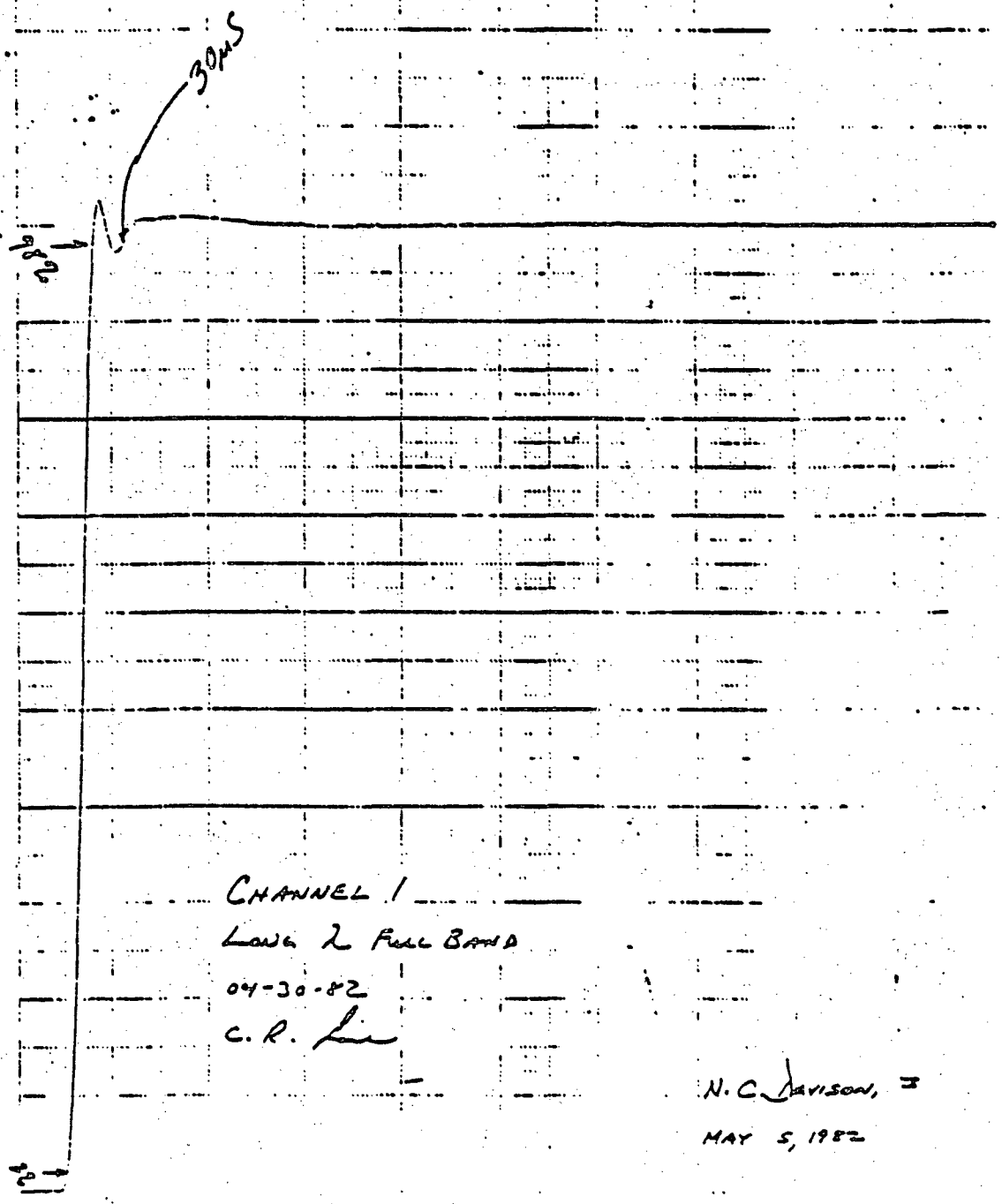
34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED | ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 21-21 | DATE: 5/10/82 | 38. SPACECRAFT SYSTEM ENGINEER | ORG | DATE

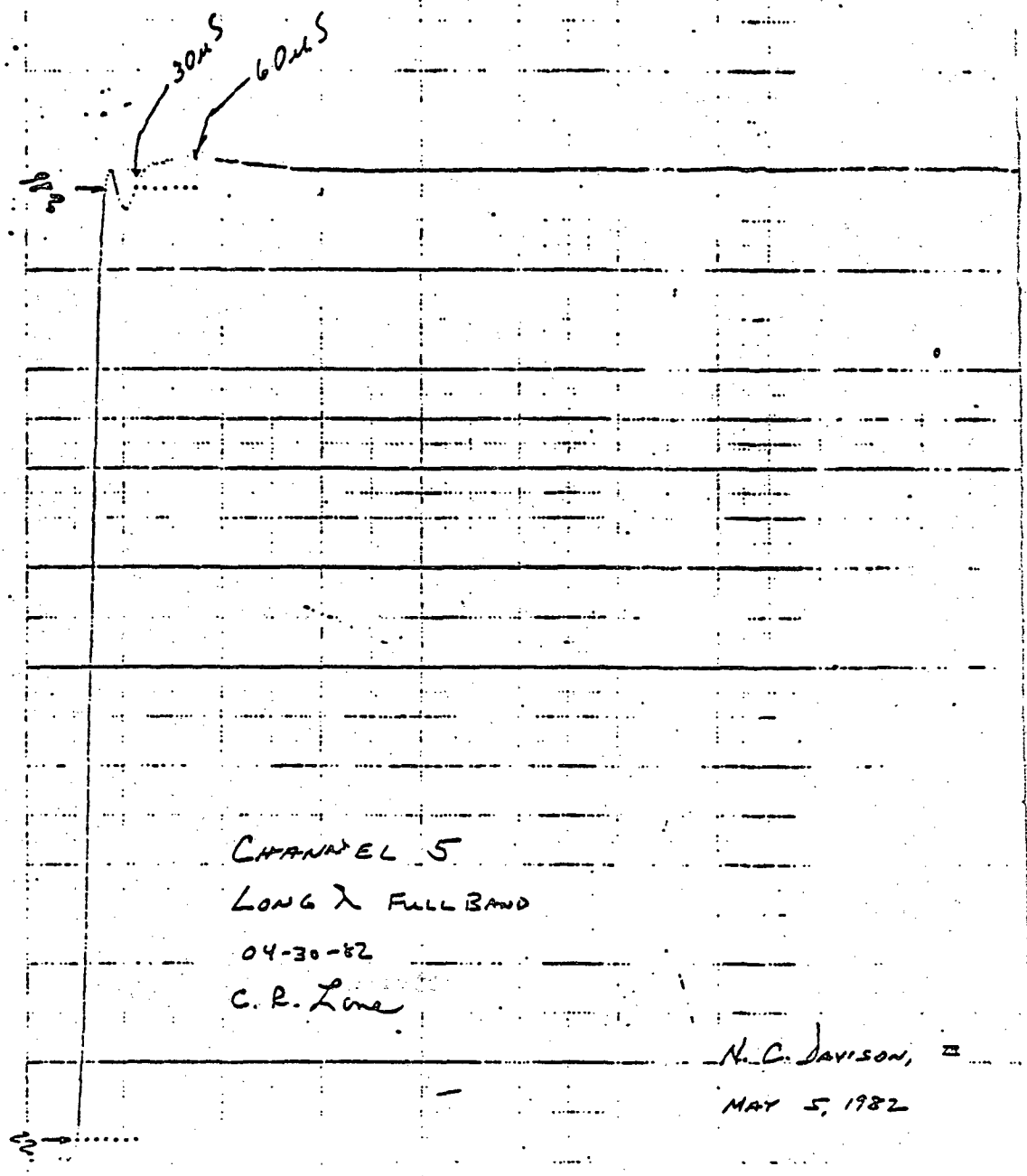
39. RELIABILITY | ORG | DATE | 40. CUSTOMER OR SUPPLIER | DATE

211873 SC JAN 80



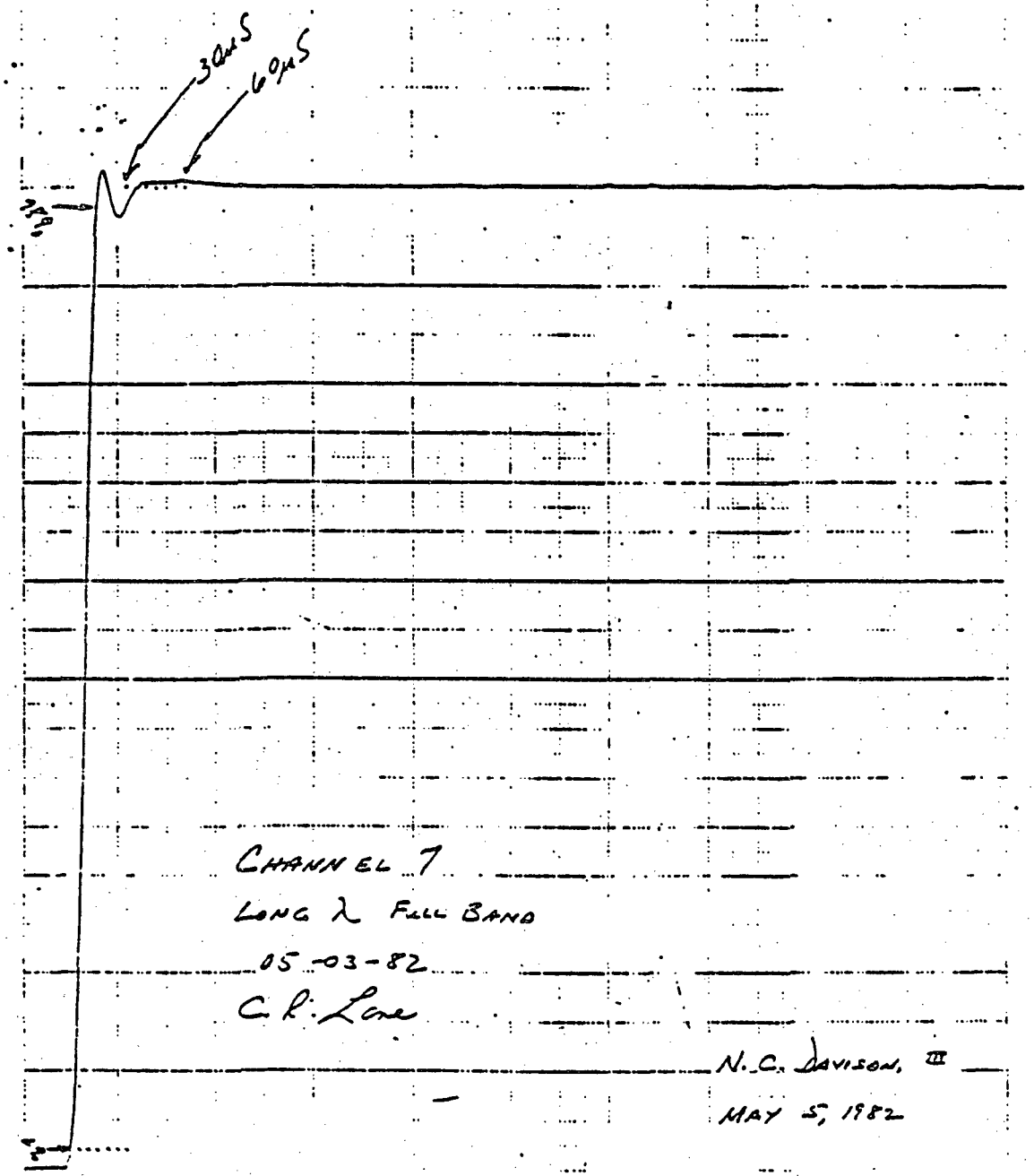
CHANNEL 1
LONG 2 FULL BAND
04-30-82
C. R. Lin

N. C. Davison, II
MAY 5, 1982



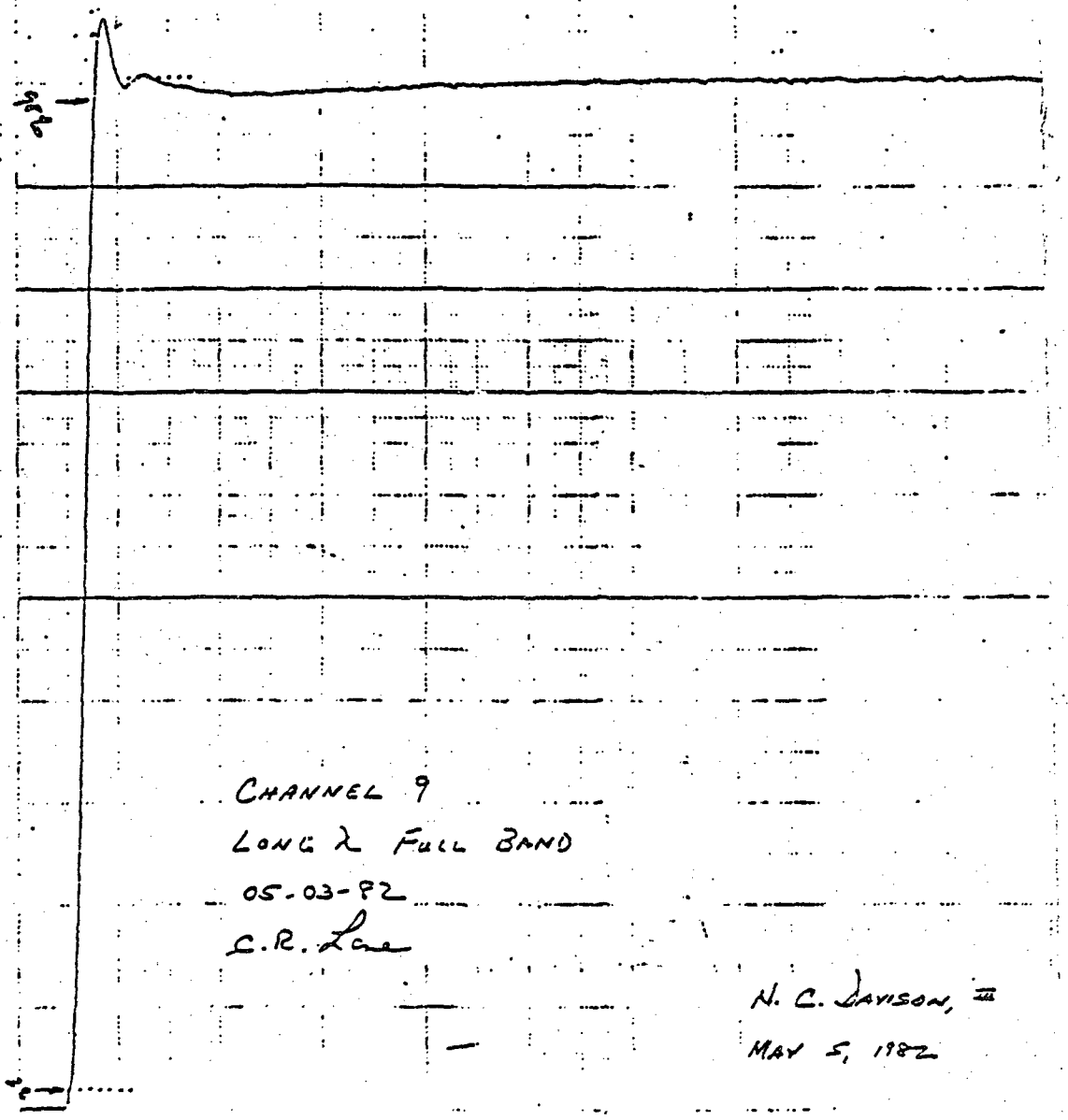
CHANNEL 5
LONG λ FULL BAND
04-30-82
C. R. Line

N. C. DAVISON, III
MAY 5, 1982



CHANNEL 7
LONG λ FULL BAND
05-03-82
C. R. Lane

N. C. DAVISON, III
MAY 5, 1982



CHANNEL 9
LONG λ FULL BAND
05-03-82
C.R. Lee

N. C. DAVISON, III
MAY 5, 1982

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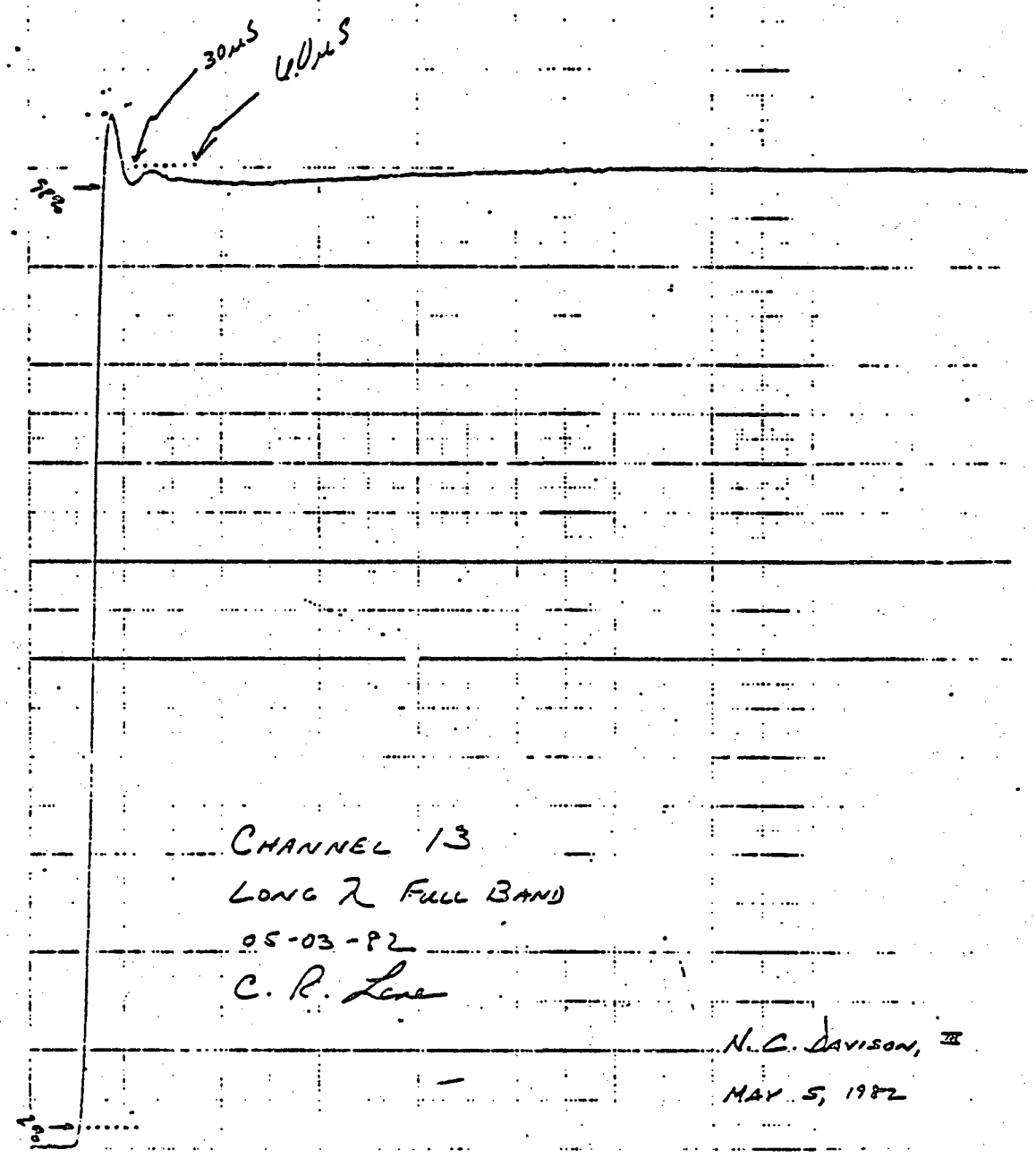

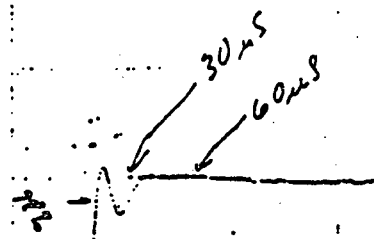

CHANNEL 15

LONG & FULLBAND

05-03-82

C. R. Lane

N. C. DAVIDSON, III

MAY 5, 1982

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ENGINEERING ORDER / REVISION NOTICE NO. ____
SHEET

TITLE TEST FIXTURE
Local Plane Pre Amp Assembly

DRAWING NUMBER
16306 Rev J

DESCRIPTION OF CHANGE
Data Sheet To

4.8 Ground Continuity and Isolation Data Record

To	Reading	Spec Requirement
J1-1	6.9	① < 11 ohms
J1-5	7.4	② > 1.0 Meg ohms
J1-23	7.9	
J1-27	6.2	
J2-6	~~6.9~~ 8.1	
J2-10	8.5	
J2-27	7.6	
J2-31	7.2	
J1-11	108Ω *	
J1-18	9.6M	
J2-15	10.2M	
J2-21	11.8M	
		②

HB S/N 211-1

READING INCORRECT. PERFORMED WITH SHORTING PLUGS IN OTHER HALF BAND. NEW VALUE TAKEN 5-5-82: 5.7 MΩ. IN SPEC!
Willie C Davis III
5-5-82

NOT ACCESSABLE IN FULL BAND CONFIGURATION

TEST E... G R Lee 05-03-82
TEST ... Willie Davis 5-5-82
QUALITY CONTROL ... DATE 5/5/82 5/5/82

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 3564A

SHEET 2

DRAWING TITLE: TEST PROCEDURE
Coax Plane Set-up Assembly

DRAWING NUMBER: 16306 Rev J

DESCRIPTION OF CHANGE:
Add new Data Sheet to specification (at end):
4.8 Ground Continuity and Isolation Data Record

J1-16

To	Reading ①
J1-1	5.3
J1-5	6.2
J1-~~3~~ 8	5.5
J1-~~2~~ 7	4.8

To	Reading ①
J~~3~~-6	5.3
J~~3~~-10	5.6
Jα-~~2~~ 1	5.6
Jα-3	4.8

To	Reading ②
J1-1	~~10.3M~~ ohms 10.9Ω *
J1-18	10.3M
Jα-15	10.3M
Jα-~~2~~ 1	10.4M

To	Reading ③
Chassis	

→ NOT ACCESSIBLE IN FULL BAND CONFIGURATION

Spec Requirements
① < 11 ohms
② > 1.0 Mohms

HB S/N 210

READING INCORRECT. TAKEN WITH SHORTING CONNECTORS IN OTHER HALF BAND. NEW READING TAKEN 5-5-82: 7.15 MΩ. IN SPEC!
5-5-82

Test Engineer C. R. Lawton Date 5-5-82
Test Supervisor _____ Date _____
Quality Control _____ Date 5/5/82

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 5-10-82

PROCURING ACTIVITY NO.: 4

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Drive-Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[ ] FUNCTIONAL	[ ] ALLOCATED	[X] PRODUCT	[ ] YES [X] NO
F-1	11323	TM	W-156				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	MOD. NO.
a. SYSTEM				11323	51740		
b. ITEM				11323	51258		
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Terminal Board to replace spliced cooler door motor lead

10. CONTRACT NO. & LINE ITEM: NAS-5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Motor, AC-Gearhead

16. PART NO. OR TYPE DESIG.
51258

17. LOT NO.

18. QTY
1

19. REQUIRES DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE
6 Week delay if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER
One lead from the radiative cooler door motor contains a splice of unknown origin. The splice will be eliminated by means of an added terminal board per approved planning.

History of part will be researched, with results to be documented by 5-24-82.

24. NEED FOR DEVIATION/WAIVER
Splices are not allowed per NHB 5300-4. Use of an additional terminal board allows elimination of the splice with minimum impact on cost and schedule. The lead that had been spliced is a 28 gage wire to the brake input.

RE L. Perkins 5-10-82
QA W. D. Williams
PE W. D. Williams for L. Watkins
REA W. Balmibi SYS ENGR J. H. Engel

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. H. Engel 5/11/82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: George B. Gitt
DATE: 5/11/82

DD FORM 1694

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 49P

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Drive, Goleta, 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
SPARE	11323	TM	W-157

5. CASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR CODE	NUMBER	REV.	ADD. NO.
11323	51015	D	2950-A

9. TITLE OF DEVIATION/WAIVER
Permission to use Halfband S/N 211-1

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF EFFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [ ] MINOR [X] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Halfband Assy.

16. PART NO. OR TYPE DESIG.
51015

17. LOT NO.
211-1

18. QTY

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None if approved

21. EFFECT ON DELIVERY SCHEDULE
None if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Permission to use Halfband S/N 211-1 with transient response settling to 1% by 90usec vs a specification of 60usec.

24. NEED FOR DEVIATION/WAIVER
This unit had been reworked a number of times and this was the best result. Halfband has since been assembled into spare band level assembly S/N 501-2. Rework at this time is not considered cost effective.

RE [signature] MAL CCB

QA [signature] 5-13-82

5/11/82
REA [signature] SYS ENGR [signature] 5-12-82 PE [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 004 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE [signature] TITLE Prog Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY SIGNATURE DATE

DD FORM 1692

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HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8231

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. V011/PL1162		FLIGHT	2:00 p.m.	MO JAN. DA 27, YR 1982

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	HALF BAND	5101S-1	211-1	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CHANNEL NO. 1 FAILS TO MEET TRANSIENT RESPONSE REQUIREMENTS. IS: 1.5% AFTER 60 μSec. REQUIREMENT: ≤ 1.0% AFTER 60 μSec

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16306	4.6	N.C. DAVISON III	2223	1/27/82	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Further work is not likely to bring better results. The variation of age components accounts

21. AUTHORIZATION: [signature] ORG 2121 DATE 3/10/82 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: The settling time is dependent upon the distributive capacitance of the filter op amps. With this cause stated in specification, this is as good as can be done.

Ref IW-158

31. CONTINUATION ☐ SHEET USED

31. FRB CLOSURE

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

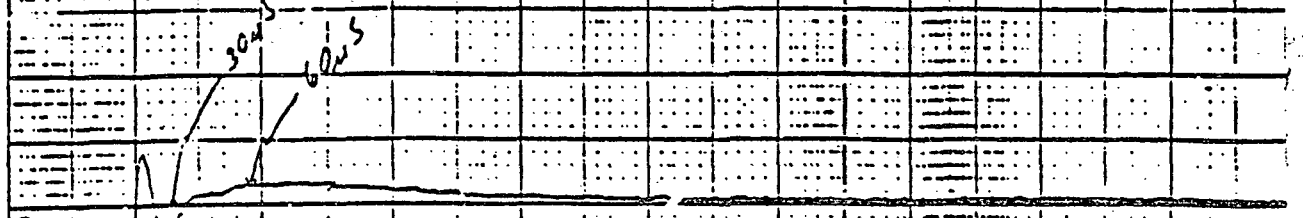
34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	3/10/82			

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE

211872 SC JAN 80



CHANNEL 1

HB S/N 211-1

01-27-82

C. R. Law

N. C. DAVIDSON, III

JAN. 27, 1982

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REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 2

1. ORIGINATOR NAME AND ADDRESS: David M. Randall

SBRC, 75 Cremmar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEVIATION NO.
Spare	11323	TM	W-158

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	ICN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MFR. NO.
11323	51015	D	2950-A

9. TITLE OF DEVIATION/WAIVER: Permission to use Halfband S/N 101-1

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION TYPE NOMENCLATURE: Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.: II

13. DEFECT NO.:

14. EFFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Halfband Assembly

16. PART NO. OR TYPE DESIG.: 51015

17. LOT NO.: 101-1

18. QTY: 1

19. REQUIRES DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: None if approved

21. EFFECT ON DELIVERY SCHEDULE: None if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use Halfband S/N 101-1 with Ch. #1 Frequency response of +. 6dB at 20KHZ vs a specification of +.1 to -.9dB

24. NEED FOR DEVIATION/WAIVER

This unit had been reworked a number of times and this was the best result. Halfband has since been assembled into spare band level assembly S/N 501-1. Rework at this time is not considered cost effective.

REA D M Randall 5/11/82 SYS ENGR [illegible] 5-13-82 RE C. Perlow 5-13-82

QA [illegible] 5-12-82 PE [illegible] 5-13-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 51065 SN 006 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: for FZ Phillips TITLE: Asst Program MGR.

27. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [ ] APPROVED [ ] DISAPPROVED

GOVERNMENT ACTIVITY SIGNATURE DATE

DD FORM 1694

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8401

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM V011		FLT	P.M.	MO 6 DA 3 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MCAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY		S1015-1	101-1	SERC
10. ☐ MODULE ☐ MCAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: FREQUENCY RESPONSE IS +.6 DB AT 20KHz CH 5 SHOULD BE +.1 TO -0.9 DB. CH #1

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16306	4.6	N.C. DAVISON	2213	6-4-81	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Further rework is not likely to bring better results. No investigation of any components required.

21. AUTHORIZATION: [signature] ORG 2221 DATE 6/4/81 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: The burning response plateau is insignificant when the distortion and capacitance of the feedback resistor. With the current supply resistors, this is as good as it'll be done. Ref M-158

31. CONTINUATION ☐ SHEET USED

32. FAB CLOSURE

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2221	6/10/81			

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE

COLD FOCAL PLANE/COOLER CABLE

Listing of Liens

COLD FOCAL PLANE/COOLER CABLE
P/N 50973

FLIGHT

Failure Reports Number

Open	Closed
S8213(Spare)	F2387
S8218(Spare)	F2664
	F2665
	F2667
	S8018
	S8205
	S8207
	S8208
	S8209(Spare)
	S8219
	S8225
	S8226
	S8230
	S8319
	S8328(Spare)
	S8340
	S8394
	S8439
	S8439
	S8443
	S8461

Deviations/Waivers

D-141	W-109
	W-110
	W-111
	W-113
	W-130
	W-132
	W-133
	W-134
	W-135
	W-142
	W-146
	W-152
	W-153
	W-161
	W-162
	W-163
	W-164

COLD FOCAL PLANE

P/N 50973

FLIGHT Failure Report No.		PROTFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
S8213 (Spare)	F2387		F0592		
S8218 (Spare)	F2664		F0607		
	F2665		F0608		
	F2667		F0610		
	S8018		F0614		
	S8205		F0615		
	S8207		F0616		
	S8208		F0617		
	S8209(Spare)		F0618		
			F0623		
			F1701		
	S8219		F1704		
	S8225		F1705		
	S8226		F1722		
	S8230		F1725		
	S8319		F1726		
	S8328(Spare)		F1727		
	S8340		F1749		
	S8394		F1754		
	S8438		F1755		
	S8439		F1767		
	S8443		F1770		
	S8461				

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-23-82

PROCURING ACTIVITY NO.: F-1

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
S	11323	TM	D-141

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [✓] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	*		

9. TITLE OF DEVIATION/WAIVER: Permission to use cooler cables of previous design

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Spare CFPA Assy

16. PART NO. OR TYPE DESIG.: 50973-B

17. LOT NO.: 301

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $100,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: Greater than six months if not approved

22. EFFECT ON INTERCHANGE, LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use cooler cables of a design that does not incorporate the latest artwork change. This artwork change enlarged the pad area around the solder pads at the distribution board end of the cable. The cables that will be used are of the same design as those used successfully on PF and F.

*Drawings Affected

SN	Number	Rev	NOR. No.
202	51393	C	3941A
301	50970	C	--
102	50974	D	--
202	50992	C	--

24. NEED FOR DEVIATION/WAIVER

The cables that were made with the latest artwork change, that incorporated the enlarged pad areas, were not plated to the proper thickness in the solder pad areas. As a result, the pads are being dissolved by solder. To reprocure cables of this design would require a six-month delay and be quite costly.

REA W M Randall 2/25/82 SYS ENGR J L Cargal RE [illegible] 2/25/82 QA [illegible] 2/25/82 PE [illegible] 3/1/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 004 5105 SN 004 ONLY

26. SUBCONTRACTING ACTIVITY AUTHORIZING SIGNATURE: J L Cargal 2/25/82 TITLE: MGR SYSTEMS ENGR.

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B Gist DATE: 3/1/82

DD FORM 1694

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DUPLICATE MASTER

CFD

H

Program Instruction 010

David N. Mansell
NSSC, 79 Carnegie Drive, Goleta, CA. 93117

11923	TM	H-1109	

Permission to Assemble Band 7 Detector with Discrepant Band 5 Detector.

NAS 5-24309

Radiometer

Coaled Focal Plane Assy	30973-B	201	1	

$10,000 if not approved.

Two weeks if not approved.

None

This waiver requests permission to proceed thru mounting, wirebonding and testing the Band 7 detector with a discrepant Band 5 detector still on the FPA. The Band 5 detector has had conductive epoxy repair of open traces on Ch 10 & 12, Channel 10 has a thermal detector slug epoxy repair. All other channels, including Ch 17, are operating to specification.

The FPA has had numerous detector changes and further detector changes could result in loss of the entire FPA. This waiver will allow evaluation of the Band 7 detector before deciding whether to replace the Band 5 detector.

PEA D.M. Radzykewycz SYS ENGR L.B. Conrad PA Daniel O'Brien PE R.E. Nelson

003 51065 SN 003 ONLY CMO

Minor - System Engineering
Major/Critical - Program Manager

APPROVAL DISAPPROVAL

NASA GSFC

Richard B. Kurtz 9/29/94

DD Form 1694

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 4

1. ORIGINATOR NAME AND ADDRESS: David M. Randall

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-110

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

	MFR. CODE	NUMBER	REV.	MFR. NO.
a. SYSTEM	11323	50973	B	2870A
b. ITEM				
c. TEST PLAN				

9. TITLE OF DEVIATION/WAIVER: Permission to test and repair discrepant Band 7 Detector.

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Cooled Focal Plane Assy

16. PART NO. OR TYPE DESIG.: 50973-3

17. LOT NO.: 201

18. QTY: 1

19. REQUIRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: $30,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Two weeks if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to test ~~and then repair discrepancies described in NCMR 277756 and NCMR 277757. Copies of NCR's are attached.~~ THE RESULTS of THIS TEST AND physical examination of All remaining detectors in STOCK (FLIGHTSTORES) could be reviewed with NASA prior to repair and test.

24. NEED FOR DEVIATION/WAIVER

The FPA has had numerous detector changes and further detector changes could result in loss of the entire FPA. This waiver will allow evaluation of the Band 7 detector before deciding whether to replace it.

REA D.M. Randall SYS ENGR _____

RE R. Huber

QA Lionel Johnson 10-7-81

PE R.J. Wilson

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

003 51065 SN 003 ONLY

CMO [illegible]

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: W. Jenkins for JENGEL 7 OCT '81

TITLE: Minor - System Engineer
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Gitt DATE: 10/7/81

DD FORM 1694

NOTICE OF REVISION (NOR)
(SEE MIL-STD-480 FOR INSTRUCTIONS)

W-110-R1

This revision described below has been authorized for the document listed.

1. ORIGINATOR NAME AND ADDRESS	DATE	MFR CODE	NOR. NO.
D. Randall	9 Oct. '81	11323	2870A

2. TITLE OF DOCUMENT	3. MFR. CODE	4. DOCUMENT NUMBER	5. REVISION LETTER (CURRENT)	6. ECP NO. (NEW)
Permission to test and repair discrepant Band 7 Detector	11323	50793	B	

7. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES	CLASS
Cooled Focal Plane Assy.	Minor

8. DESCRIPTION OF REVISION

Test results are acceptable. Request permission to repair and retest as required.

9 Oct 81

REA A.T. Walker for D. Randall SYS ENGR [signature] for JENGEL PE A.T. Walker

9. THIS SECTION FOR GOVERNMENT USE ONLY

A. CHECK ONE

☐ EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

☐ REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

☐ CUSTODIAN OF MASTER DOCUMENT SHALL MARK ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

B. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT	SIGNATURE AND TITLE	DATE
	[signature]	

10. ACTIVITY ACCOMPLISHING REVISION	REVISION COMPLETED (SIGNATURE)	DATE
NASA - GSFC	[signature]	10/9/81

DD FORM 1695

HUGHES
HUGHES AIRCRAFT COMPANY

NONCONFORMING MATERIAL REPORT (NCMR)

NO. 211134
DATE 10/5/81
PAGE 1 OF 1

PROGRAM ID TM V012 FPRG

PART NO.	S/N	ENG. CHANGES	NOMENCLATURE
5095P (B)	162	—	InSb Detector Array

WORK ORDER DOC NO.	LOT SIZE	QTY. SUSP.	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
—	1.0	1.0	In process	—	5095 Oper 318 Supp. 1 MRCO 27757 Oper 200

SUPPLIER	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO.	ITEM NO.	R.R. NO.
SBRC					

ITEM NO.	QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	1	1	Hole ~ .0004" deep in end of bond pad - Ch. 9.	SBRC	0	MRB	G
2	1	1	Det Return adjacent to Ch. 9 bonding pad - Redundant pad removed. >50% of main pad removed.	SBRC	0	MRB	G
3	1	1	Ch 10 bond pad - pad ~ 60% removed (.004" long - .0035 good)	SBRC	0	MRB	G

ORIGINATOR B. L. Montgomery DATE 10/5/81 QUALITY B. L. Montgomery DATE 10/5/81 ENGINEERING [signature] DATE 10/5/81

ITEM NO.	DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
1	US	Use As Is. Hole not a problem if unit tests good.	
2	R	Repair per MSRCO	
3	US	Use As Is. Redundant bonding pad remains of bond looks good and full tests good.	
		(3) DISPOSITION REJECTED. HAVE REMAINS CRACKS AND STRESS LINES ADJACENT TO DETECTOR RETURN & CH 9. DEFECTS NOT CONSIDERED MINOR. UNIT REQUIRES REWORK TO DISP OF W	

ENGINEERING [signature] DATE 10/5/81 QUALITY B. L. Montgomery DATE 10/5/81 (3) CUSTOMER Ref AFDR D-060-81 DATE

ITEM NO.	CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION	CORRECTIVE ACTION
1,2,3	Removed during removal of excess chips - chips are due to damage during the dicing operation.		1,2,3 - Dicing procedure changed to utilize diamond saw rather than the wire saw previously used.

SIGNATURE B. L. Montgomery DATE 10/6/81 SIGNATURE B. L. Montgomery DATE 12/6/81

RESPONSIBILITY: VENDOR	RESPONSIBILITY: HAC	DEBIT VENDOR: YES	DEBIT VENDOR: NO	DISP.CODE	VENDOR PACKING SHEET	QTY. R.T.V.	QTY. SCRAP	BUYERS SIGNATURE	DATE	COPY
☐	☐	☐	☐							

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HUGHES
HUGHES AIRCRAFT COMPANY

NONCONFORMING MATERIAL REPORT (NCMR)

DATE 10/5/81
PAGE 1 OF 1

PROGRAM ID V012 TM 7PRG

PART NO.	S/N	ENG. CHANGES	NOMENCLATURE
50973 (B)	201		CFP Assy (Band 7 wire bonding

WORK ORDER DOC NO.	LOT SIZE	QTY. SUSP.	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
	1	1	Inprocess		MRCO 27752 AIR 50973 Suppl 20 per 31

SUPPLIER	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO.	ITEM NO.	M.R. NO.

ITEM NO.	QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	1	1	Crescent band Ch. 9 - per SP80195 3j - no visible line of undisturbed metal alongside the band.	SBRC	0	MRB	G
2	1	1	Trace Ch. 9 (on bond pad) ~80% open	SBRC	0	MRB	G
3	1	1	Crescent band appears to be partially over void in the bonding pad - 201 - Ch. 7, Ch. 2	SBRC	0	MRB	G

ORIGINATOR B. L. Montgomery DATE 10/5/81 QUALITY B. L. Montgomery DATE 10/5/81 ENGINEERING [signature] DATE 10/5/81

ITEM NO.	DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
1	E	Repair per MERCO	
2	E	Repair per MERCO	
3	B	Rec'd as Ch. 9 voids are small and adjacent to trace remains, and pull tests good. ⑧ DISPOSITION REJECTED. THERE REMAINS EVIDENCE OF CRACKS & STRESS LINES ADJACENT TO DETECTOR RETURN & CHIP. DEFECTS NOT CONSIDERED MINOR. UNIT REQUIRES REWORK TO B/ OR WAIVER ALSO REF AFOR D-060-61	10/6/81

ENGINEERING [signature] DATE 10/5/81 QUALITY R. L. Montgomery DATE 10/5/81 CUSTOMER DATE

ITEM NO.	CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION	CORRECTIVE ACTION
1	Improperly placed wire bond		Verbal instructions to the operator regarding
1,2,3	Gold removed during removal of wire bond. Improperly placed wire bond required removal, poor adherence of the Au to the Ti resulted in loss of gold.		procedure to be followed if rework is required

SIGNATURE B. L. Montgomery DATE 10/6/81 SIGNATURE B. L. Montgomery DATE 10/6/81

RESPONSIBILITY		DEBIT VENDOR		DISP.CODE	VENDOR PACKING SHEET	QTY. R.T.V.	QTY. SCRAP	BUYERS SIGNATURE	DATE	COPY
VENDOR	HAC	YES	NO							
☐	☐	☐	☐							

11628 CS OC

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Program Instruction 010

H

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: CFP

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: D.M. Randall
SBRC, 75 Coromar Dr., Golata, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W111

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. GRADINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	50973	B	2870 A

9. TITLE OF DEVIATION/WAIVER: Permission to continue testing with discrepant Band 5 and Band 7 detectors.

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Cooled Focal Plane Assy

16. PART NO. OR TYPE DESIG.: 50973-B

17. LOT NO.: 201

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: $60,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Four weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to continue testing thru determination of postamp selects with CH 10 Band 5 disconnected and silver epoxy repaired traces on the Band 7 detector.

24. NEED FOR DEVIATION/WAIVER

This waiver will allow the CFPA to proceed while a major waiver to allow use of FPA with discrepant Band 5 and 7 detectors is being reviewed.

REA D.M. Randall SYS ENGR J.L. Cooper PE R.J. Wilkens 10-16-81 QA [illegible] 10-16-81

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 003 51065 SN 003 ONLY CMO [illegible]

26. SIGNATURE AND ACTIVITY AUTHORIZED TO SIGN: J.L. Cooper 81016

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [✓] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY

SIGNATURE

DATE

DD FORM 1694

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFG. CODE	c. SYS. DESIG.	d. DEVIATION/WAIVER NO.
F	11323	TM	W-113

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFG. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFG. CODE	NUMBER	REV.	NOR. NO.
11323	50958	B	–

9. TITLE OF DEVIATION/WAIVER: Permission to use non-conforming InSb Detectors

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: InSb Detector Arrays

16. PART NO. OR TYPE DESIG.: 50958-B

17. LOT NO.:

18. QTY: 4

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $200,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE: Three months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

None

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to use InSB Detector Arrays SN 906-3316-11 #114, 906-3316-11 #88, 906-3316-13 #?*, and 906-3316-A-13 #102. These arrays have small oxide chips and cracks at their edges. The chips that represent potential loose particles will be bonded in place using 2216 epoxy and then tested to verify they are still good electrically. After rework of the Arrays the Array selected shall be assembled to the Cold Focal Plane Assembly and be subjected to : a base line test, 10 temperature cycles, a repeat test, then visually examined for acceptance.

*The serial number on this array cannot be read.

In addition each array will be temp cycled 10 times at the array level and inspected prior to use.

24. NEED FOR DEVIATION/WAIVER

These arrays are the only candidate arrays for replacing the discrepant Band 7 detector presently on the Flight CFPA. It will be at least three months before new detectors can be processed.

REA *D M Randall* 10/28/81 SYS ENGR *J h Engel*

RE *[signature]* 10/28/81

QA *[signature]* 10/28/81

PE *[signature]* 10/28/81

CMO *[signature]*

25. PRODUCT OR EFFECTIVITY BY SERIAL NUMBER
003
51065 SN 003 ONLY

26. a. APPROVING ACTIVITY SIGNATURE: *J h Engel* 10/29/81

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC.

SIGNATURE: *George B. Gitt* DATE: 11/2/81

DD FORM 1694

GENERAL FLOW OF DISCREPANT InSb Detectors

per Waiver W-113

1. The four array's will be inspected and each defect (crack) will be measured and a photo taken of the array.
2. The array's will be subjected to 10 temp. cycles ambient to liquid nitrogen.
3. Visually inspected and photographed.
4. One will be selected for mounting on the CFPA and mounted.
5. Visually inspected/photographed
6. Temperature cycled 10 times in a dewar.
7. Visually inspected/photographed.

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REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 11

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES [X] NO
Spare	11323	TM	W-130				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	MOD. NO.
a. SYSTEM							
b. ITEM				11323	50955	E	2444A, 3121A
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Permission to use Spare CFPA with damaged traces.

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. CD TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
PWB, Distribution	50968		1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $20,000-if not approved

21. EFFECT ON DELIVERY SCHEDULE
4 weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

Copper traces on distribution PWB were damaged during a trimming operation. The traces are not cut thru and examination of a like defect on a spare board shows that adequate trace remains. Damage is per NCMR 392551. More than half of trace remains intact.

24. NEED FOR DEVIATION/WAIVER

To rework this board would require removal and reinstallation of 100 wire bonds. The rework to the board itself would need to be developed and if unsuccessful would result in a new procurement that would take an additional 6 to 8 weeks. There is also some risk in removing and reinstalling the wirebonds.

RE [signature] 1-2-

QA [signature] 1-20-82

REA [signature] 1/20/82 SYS ENGR [signature] PE [signature] 1-2

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
004

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE [signature] 1/20/82 TITLE

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Gantt DATE: 1/21/82

DD FORM 1694

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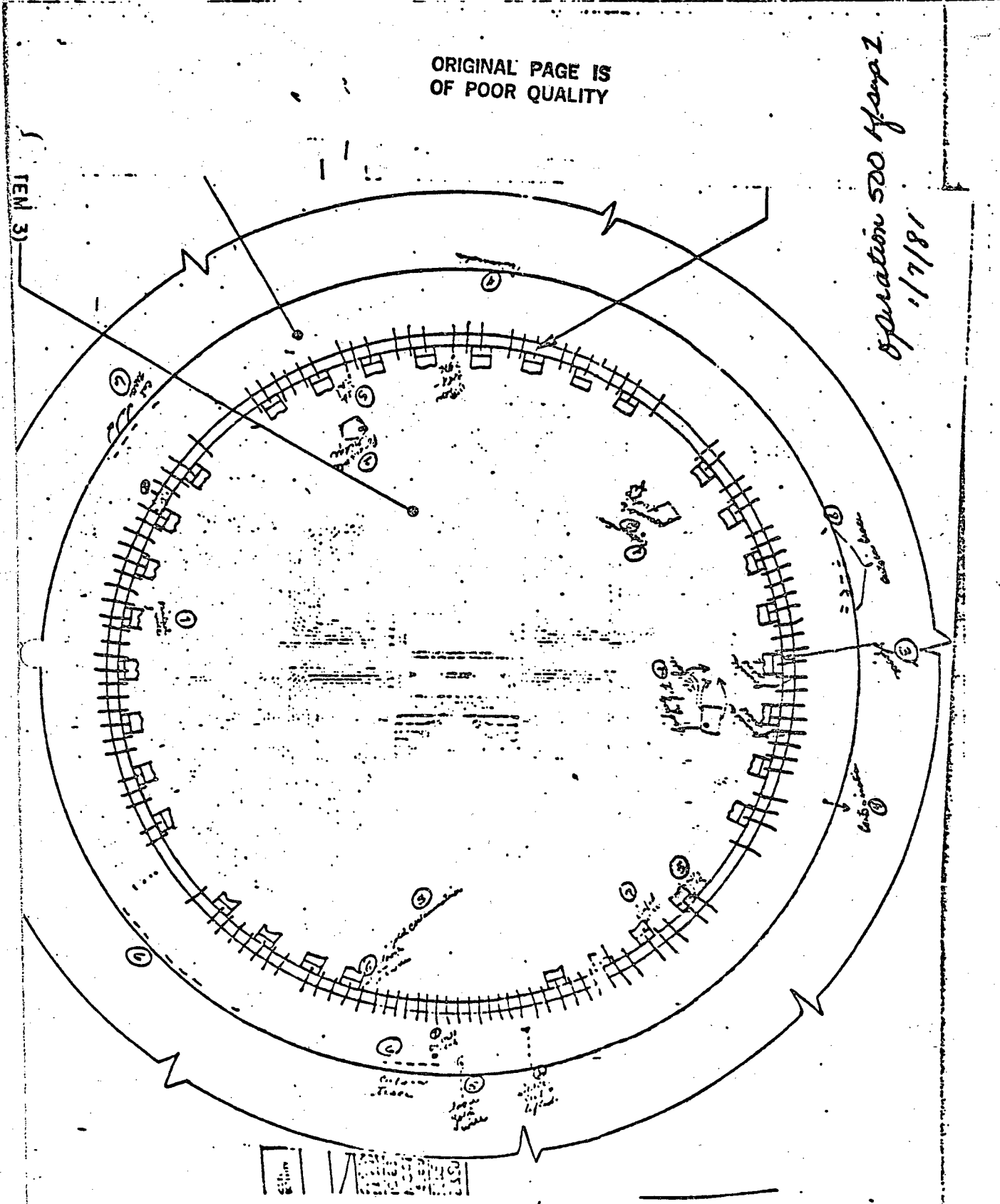

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 1-30-92

PROCURING ACTIVITY NO.: F1

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-133

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50958	B	--

9. TITLE OF DEVIATION/WAIVER
Permission to use non-conforming InSb Detectors

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
InSb Detector Arrays

16. PART NO. OR TYPE DESIG.
50958-B

17. LOT NO.

18. QTY
4

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $200,000 if not approved -

21. EFFECT ON DELIVERY SCHEDULE
Three months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver cancels and supersedes W-113

This waiver requests permission to use InSbDetector Arrays SN 906-3316-11 #114, 906-3316-11 #88, 906-3316-13, #?*, and 906-3316-A-13 #102. These arrays have small oxide chips and cracks at their edges. The chips that represent potential loose particles will be bonded in place using 2216 epoxy and then tested to verify they are still good electrically. After rework of the Arrays, the Array selected shall be assembled to the Cold Focal Plane Assembly, tested, then visually examined for accepta

*The serial number on this array cannot be read.

In addition each array will be temp cycled 10 times at the array level and inspected prior to use.

24. NEED FOR DEVIATION/WAIVER

These arrays are the only candidate arrays for replacing the discrepant Band 7&5 detectors presently on the Flight CFPA. It will be at least three months before new detectors can be processed.

REA D M Randall SYS ENGR H.R. Phillips for J.T. Cuff PE

RE 2/1

QA 21-1-

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: H.R. Phillips
TITLE: PROGRAM MANAGER

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Scott

DATE: 2/2/92

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 1-27-82

PROCURING ACTIVITY NO.: 41

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-132

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50958	B	--

9. TITLE OF DEVIATION/WAIVER: Permission to use non-conforming InSb Detectors

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

12. CD NO.: II

13. DEFECT NO.:

14. CLASSIFICATION OF DEFECT: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: InSb Detector Arrays

16. PART NO. OR TYPE DESIG.: 50958

17. LOT NO.:

18. QTY: 2

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: Greater than $200,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: Two months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to use InSb Detector Arrays SN 906-3316-13 #66 and #112. These arrays have small oxide chips and cracks at their edges. The chips that represent potential loose particles will be bonded in place using 2216 epoxy after the array is bonded on the FPA. Selection of these arrays is based on the following: 1.) Best available detectors from Lot 15 for workmanship (cracks and chips) per product specification 16026. 2.) All performance specifications were acceptable (i.e. 10 meg resistance).

24. NEED FOR DEVIATION/WAIVER

These arrays are the best candidate arrays for replacing the discrepant Band 7 Detector presently on the Flight CFPA. The latest lots, 19 and 20, have exhibited 1/F noise on the FPA and it will be two months before a new lot can be fabricated and qualified.

REA D M Randall 1/27/82 SYS ENGR for J. Engel 1/28/82 RE 1-28-82 QA 1-28-82 PE 1-28-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 003

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: for J Engel 1.28.82 TITLE: Systems Engineering

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC SIGNATURE: George B Gatt DATE: 1/31/82

DD FORM 1694

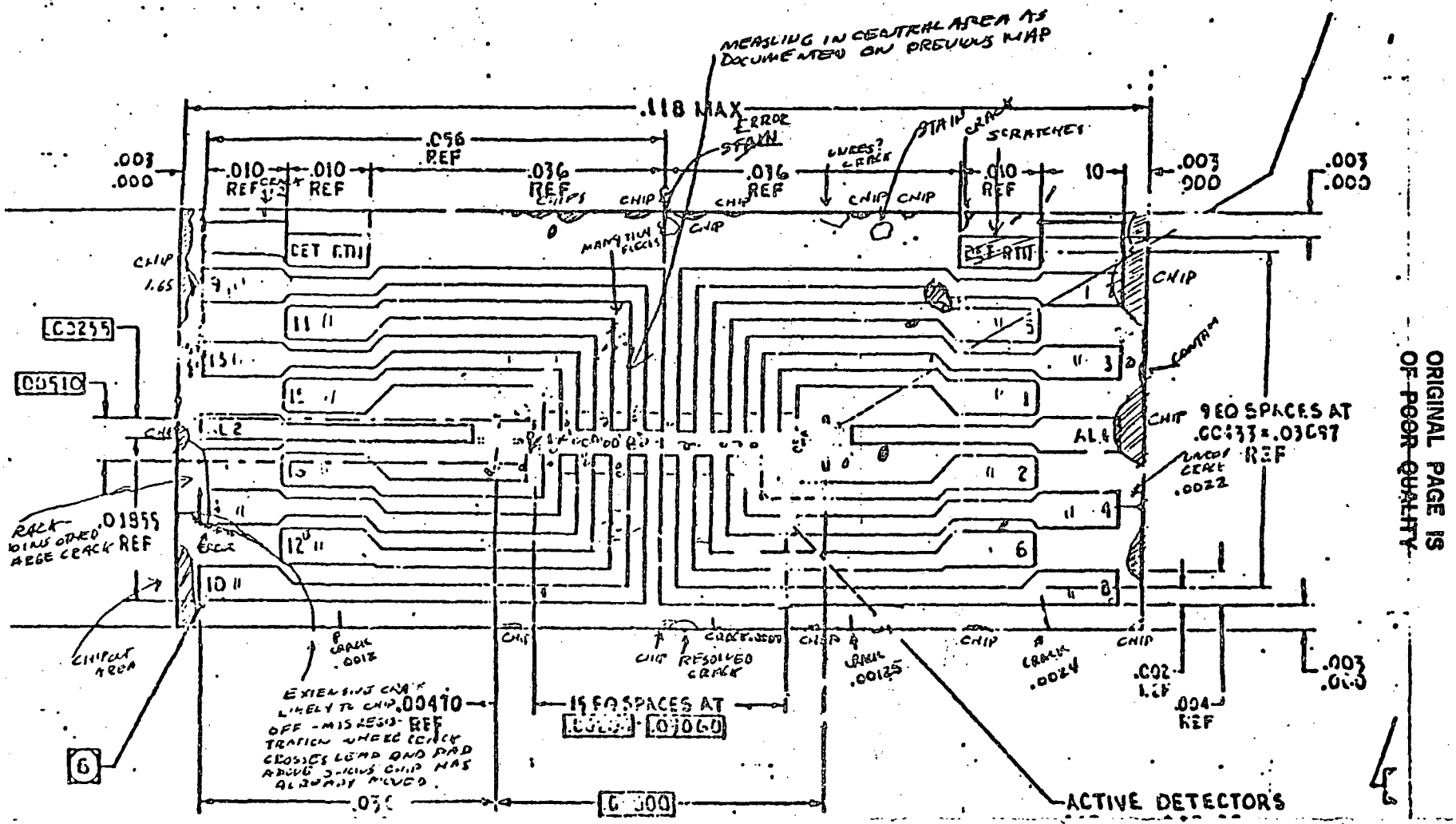
906-3316-13

1/27/82
RJR

TM LOT 15 # 66

AFTER CLEANING ON MRCO

DIMENSIONS ARE IN MILS



906-3316-13

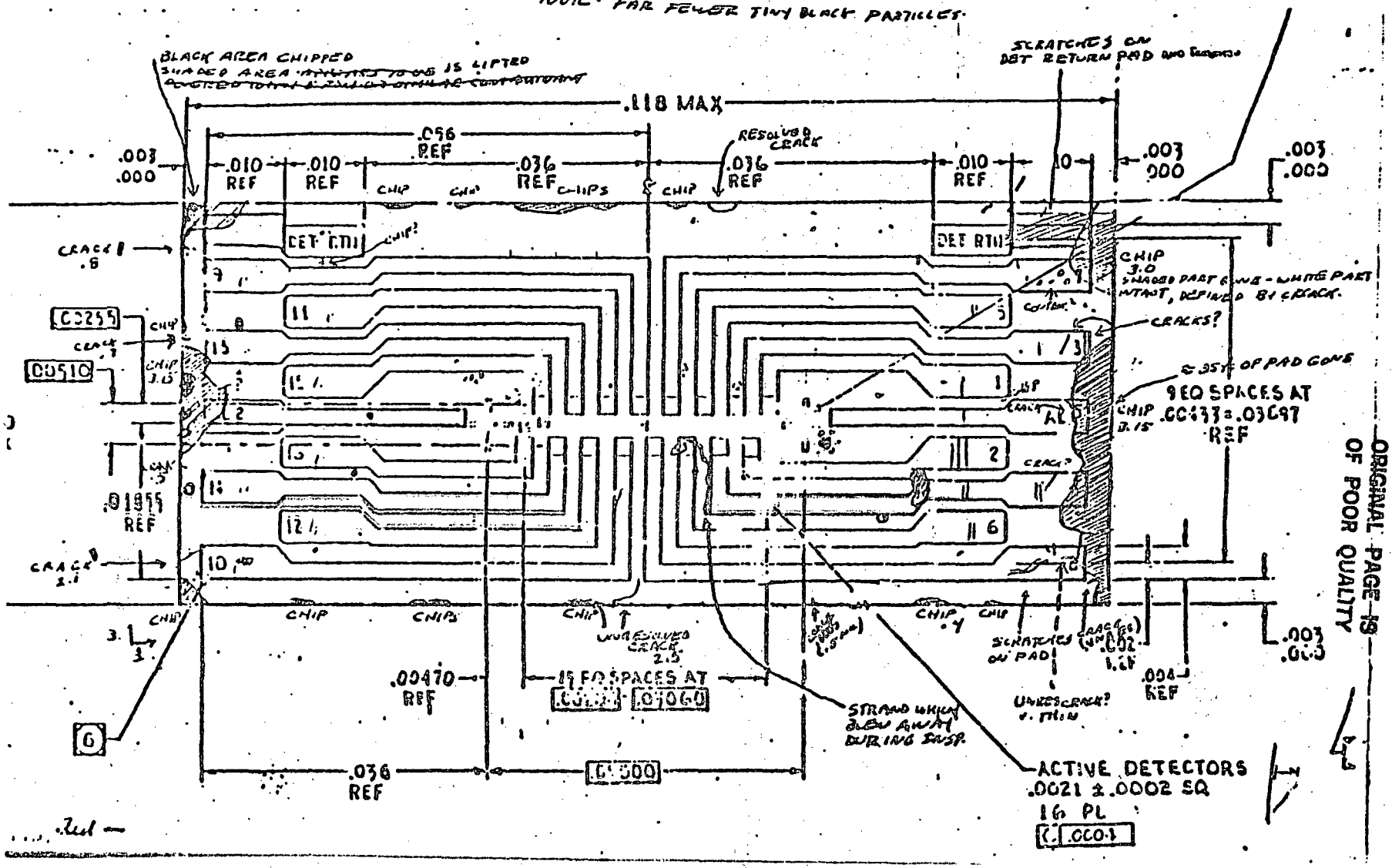
PBR
1/27/82

TM LOT 15 # 112

AFTER CLEANING ON MRCO

DIMENSIONS IN MILS

NOTE: FAR FEWER TINY BLACK PARTICLES.



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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-5-82

PROCURING ACTIVITY NO.: 4

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED	
a. MODEL/TYPE	b. MFR. CODE	c. S.I.S. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES	[X] NO
7	11323	TM	W-134					

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM							
b. ITEM				11323	50973	B	
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Permission to use CFPA with void in circuit trace.

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF EFFECT

12. CD NO.	13. DEFECT NO.	14. DEFECT CLASSIFICATION
II		[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
Cold Focal Plane Assy.	50973-B	201	1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $500,000 if not approved.

21. EFFECT ON DELIVERY SCHEDULE
4 months if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER
This waiver requests permission to use the CFPA with a possible void in the ceramic substrate trace that goes to Band 7 detector Ch. #2.

Reference NCMR 277671

24. NEED FOR DEVIATION/WAIVER
There is a pit in the substrate that the trace goes over. This pit has been filled in with 2216 epoxy residue from repeated InSb detector replacements and the trace in the pit is thus covered and not inspectable. The trace only has to be capable of passing 3 X 10^{-9} amps. The trace tests good electrically.

REA David M Randall 2/5/82 SYS ENGR for JEngel 2/5/82 RE 2/5/82 QA 2-5-82 PE 2-5 CMO 3-5-

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 51065 SN 003 ONLY

26. INITIATING ACTIVITY AUTHORIZING SIGNATURE
F R Phillips

TITLE: PROGRAM MANAGER

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC.

SIGNATURE: George B. Hait DATE: 2/9/82

DD FORM 1694

HES

NONCONFORMING MATERIAL REPORT (NCMR)

07 C2 15

NO. 27767I

DATE 1/15/82

PAGE 1 OF

PROGRAM ID V412 TM 7PRG

50973 (B)	S/N FLIGHT 201	ENG. CHANGES 2870A 3545A		NOMENCLATURE COLD FOCAL PLANE ASSY.	
DER DOC NO.	LOT SIZE 1	QTY. SUSP. 1	SUSPENDED IN INPROCESS	HARDWARE I.D. NO. 50973	REF. DOCUMENTS 50973 AHRS & 2538 SUPPT.
SBRC		DIV. OR LOCATION 060	SUPPLIER CODE 11323	P.O. NO.	ITEM NO. / R.R. NO.

QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	X 1	BAND 7 CHANNEL 2 VOID IN THE TRACE GREATER THAN 50% TO UNKNOWN		1	MRB	G
1	1	BAND 7 CHANNEL 6 VOID IN THE TRACE GREATER THAN 50% 55%		1	MRB	G
		* VISION INSPECTION CANNOT DETERMINE THE AMOUNT OF TOTAL VOID IN TRACE				

FOR P.E. Ryan DATE 1/15/82 QUALITY [signature] DATE 1-15-82 ENGINEERING [signature] DATE 1/15/82

DISP CODE	DISPOSITION/INSTRUCTIONS	STAMP
E	Use as is. There is adequate trace left to carry the signal (3 out of 4) across the detector junction.	
	WAIVER REQUIRED.	
	[signature]	

(1) PER NASA TO COORDINATION OK TO PROCEED TO TEST TO VERIFY OPERATION OF BAND 7 CH2. 1/15/82 [signature]

ING [signature] DATE 1/15/82 QUALITY [signature] DATE 1-15-82 (1) CUSTOMER DATE

RESULTS OF CORRECTIVE ACTION INVESTIGATION

CAUSE OF NONCONFORMANCE	CORRECTIVE ACTION
Vision - Possibly due to signal required to charge det. elements	MULTIPLE PROCESS CAUSE AND C/A NOT REQ'D
WAIVER REQ'D	FOR
[signature] DATE 1/15/82	SIGNATURE [signature]

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-17-82 (V1)

PROCURING ACTIVITY NO.: LI-50

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER
3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-135

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO
11323	50973	B	3895A, 2870A

9. TITLE OF DEVIATION/WAIVER
Permission to use F-1 CFPA with discrepancies per FR8208

10. CONTRACT NO. & LINE #
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.	13. DEFECT NO.	14. DEFECT CLASSIFICATION
II		[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
CFPA	50973	201	1	[ ] YES [ ] NO

20. EFFECT ON COST/PRICE
> 50,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE
4 weeks if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER
Permission to use F-1 CFPA with discrepancies per FR 8208.
A copy of FR 8208 is attached -

24. NEED FOR DEVIATION/WAIVER
To determine selects that would improve the pulse response would require removal of the optical filter assembly and retest. This is a risky operation and there is no guaranty that the results of reselection would give in specification performance. Discrepancies are small and will not affect performance enough to warrant rework.

REA DM Randall 2/12/82 SYS ENGR JL Cooper RE 2/12 QA 2/12 PE 2/12

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: FR Phillips TITLE: Program Manager.

27. APPROVAL/DISAPPROVAL

a. [X] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: LANDSAT-D PROJECT OFFICE

SIGNATURE: [illegible] DATE: 2/18/82

DD FORM 1694

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HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

S 8208

ORIGINATOR

1 PROGRAM NAME AND NUMBER	2 GLA	3 MODEL	4 TIME OBSERVED	5 DATE OBSERVED
T.M. (PL 1162)		FLT-1	VARIOUS	MO 2 DA 11 YR 1982

6 HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7 SUBSYSTEM				
8 UNIT				
9 ☒ ASSEMBLY ☐ SUBASSEMBLY	CFPA IN DEWAR	50973	201	SBRC
10 ☐ MODULE ☐ MICAM ☐ CARD				
11 OTHER				

12 TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13 ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 92.5 AXIS FOR MIN TYP ☐ THERMAL VAC HRS AT ☐ OTHER

14 DESCRIPTION OF FAILURE: SEE CONTINUATION SHEETS A AND B.

15 TEST PROCEDURE	PARA	16 ORIGINATOR	ORG	DATE	17 CONTINUATION SHEET USED
16192	4.14, 4.15	N.C. DAVISON, III	2213	11, 1982	☒

ENGINEERING EVALUATION

18 VERIFICATION AND FAILURE ANALYSIS

19 FAILED ITEM NAME AND PART NUMBER

20 ☐ FOLLOWING REWORK/RETEST REQUIRED
☒ REWORK/RETEST NOT REQUIRED BECAUSE Discussion at meeting with [illegible] not possible to analyze [illegible]

21 AUTHORIZATION	ORG	DATE	22 CONTINUATION SHEET USED
[illegible]	2121	2/5/82	☐

MANUFACTURING AND TEST

23 REWORK/RETEST ACTION TAKEN: NONE

24 QA REWORK

25 QA RETEST

26 LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27 REWORK BY	ORG	DATE	28 RETESTED BY	ORG	DATE	29 CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30 CAUSE AND CORRECTIVE ACTION: The failure response [illegible] at the [illegible] system [illegible] and the [illegible] test. The [illegible] made to [illegible] for [illegible]

31 FRB CLOSURE

31 CONTINUATION SHEET USED ☒

32 DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34 BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35 FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36 FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37 RESPONSIBLE ENGINEER	ORG	DATE	38 SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[illegible]	2121	2/5/82			

39 RELIABILITY ORG DATE

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EQUIPMENT CHECKOUT
FAILURE REPORT

CONTINUATION SHEET

S 8208 CONT. S LETTER
FR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONA CONTINUAT SHEET(S) US

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

14 BAND 5 HAS THE FOLLOWING OUT OF SPEC. CONDITIONS:
PER 16192 PARAGRAPH 4.14

TRANSIENT RESPONSE SPEC: ≐ 10% OVERSHOOT

CH. 4	IS	10.4%	CH. 10	IS	10.5%
CH. 6	IS	10.8%	CH. 11	IS	11.2%
CH. 7	IS	11.0%	CH. 12	IS	10.8%
CH. 9	IS	11.5%			

SETTLING TIME SPEC: SETTLED TO WITHIN 1.5% AFT
≃2% + 30 μSec
SETTLED TO WITHIN 1.0% AF
≃2% + 60 μSec

CH. 10 IS + 2% AFTER 38 μSec
+ 1.5% AFTER 40 μSec
+ 1.0% AFTER 45 μSec

3 dB POINTS: SPEC: -2 TO -3 dB AT 52 KHZ

CH. 10 IS. -3.19 dB AT 52KHZ
CH. 12 IS -1.95 dB AT 52KHZ

DELAY TIMES SPEC: DELAY TIMES SHALL BE WITH
± 0.5 μSec OF EACH OTHER

ALL CHANNELS AS A POPULATION DO NOT MEET THIS REQUIREMENT.

RISETIME (IN μSec)				FALL TIME (IN μSec)			
1	12.2	9	12.0	1	13.1	9	12.7
2	12.0	10	13.0	2	12.5	10	13.8
3	12.4	11	12.0	3	13.0	11	12.5
4	12.0	12	12.2	4	12.6	12	12.8
5	11.6	13	12.0	5	12.2	13	12.5
6	12.6	14	12.4	6	13.1	14	13.0
7	11.9	15	11.6	7	12.4	15	12.1
8	12.4	16	12.6	8	13.0	16	13.1

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SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

S 8208 | CONT. SHEET LETTER: B
FR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON
IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.
ADDITIONAL FR CONTINUATION SHEET(S) USED

14 BAND 7 HAS THE FOLLOWING OUT OF SPEC. CONDITIONS:
PER 16192 PARAGRAPH 4.14

TRANSIENT RESPONSE; SPEC: ≤ 10 % OVERSHOOT

CH. 6 IS 11.0 %

SETTLING TIMES SPEC: SETTLED TO WITHIN 1.5 %
AFTER τ_{20} + 30 μSec
SETTLED TO WITHIN 1.0 %
AFTER τ_{20} + 60 μSec.

CH. 5 IS SETTLED TO 1.5 % AFTER 33 μSec
CH. 5 " " " 1.0 % AFTER 35 μSec

3 dB POINTS SPEC: -2 TO -3 dB AT 52 KHz

CH. 5 IS -3.25 dB AT 52 KHz
CH. 16 IS -3.32 dB AT 52 KHz

DELAY TIMES SPEC: DELAY TIMES SHALL BE WITHIN ± 0.5 μSec OF EACH OTHER

ALL CHANNELS AS A POPULATION DO NOT MEET THIS REQUIREMENT

RISETIME DELAY (IN μSec)				FALLTIME DELAY (IN μSec)			
1	12.0	9	12.9	1	12.3	9	13.4
2	12.1	10	12.5	2	12.5	10	13.2
3	11.8	11	12.4	3	12.2	11	12.9
4	12.5	12	12.3	4	12.8	12	12.7
5	12.0	13	12.2	5	12.6	13	12.6
6	12.3	14	12.4	6	12.6	14	12.8
7	12.2	15	12.3	7	12.5	15	12.8
8	12.6	16	13.0	8	13.0	16	13.4

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 3-4-82

PROCURING ACTIVITY NO.: 1

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-142

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50973	B	2870A

9. TITLE OF DEVIATION/WAIVER
Permission to use F-1 CFPA with discrepant substrate

10. CONTRACT NO. & LINE ITEM NO.
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Substrate CFPA

16. PART NO. OR TYPE DESIG.: 50956-D

17. LOT NO.: 013

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
>2,000,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE
>1.5 years if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER
This waiver requests permission to use the F-1 CFFA with the following discrepancies against its substrate:

1) Assembly was built to planning which was never reviewed and accepted by AF and contains no inspections of any kind. 2) Depositions were performed without released process procedures (none referenced in AHR). 3) Resistance measurement data attached to AHR indicates substrate did not meet requirement specified in Drawing Note 15. 4) Deposition thickness not recorded at Operation 3150.

24. NEED FOR DEVIATION/WAIVER

This substrate cannot be replaced without completely rebuilding the F-1 CFPA. The CFPA has been tested successfully and a rebuild due to the above listed discrepancies is not deemed cost or schedule effective.

REA D.M. Randall 3/4/82 SYS ENGR J.L. Cargil

RE [illegible] 3/4

QA [illegible] 3-4-82

PE [illegible] 3/4

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003 51065 SN 003 ONLY

C.M.O. [illegible] 3-8

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE / TITLE

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Evitt DATE: 3/9/82

DD FORM 1694

Attachment to Request for Deviation/Waiver No. W-142

1. Assembly Planning (AHR) was issued for use in the fall of 1978. Investigation which was performed on the Protoflight Model, which had the same problem, was accepted, however, there appears to be no documentation to support this investigation.

2. Depositions were performed per standard procedures (hand-written) with the AHR defining the amount to be evaporated, during 1978 - 1980 period. However, the evaporation lab utilizes Laboratory Procedure Instruction (LPI) which are now being changed to Manufacturing Production Engineering Instructions (MPEI). MPEI's are being released through Production Engineering under W.G. Speth.

3. Resistance Measurements recorded on attached AHR data sheet do not meet requirements specified on drawing Note 15 which says that: "Pad to Pad resistance of traces shall not exceed 3.0 ohms." The resistance of the traces is minimal and will not have a measurable affect on the detector performance. This variation is inherent in chemical evaporation processing. See Table below for actual readings.

Measurement Point to Point	Specification	Before Temp Cycle	After Temp Cycle
Hg Cd te 5-3(-)	<3 ohms	1.8	1.7
5-3(+)	"	3.4 (OT)	2.7
5-4 -	"	4.3 (OT)	3.7 (OT)
5-4(+)	"	5.1 (OT)	4.7 (OT)
5-2(-)	"	5.0 (OT)	5.0 (OT)
5-2(+)	"	4.5 (OT)	3.8 (OT)
5-1(-)	"	3.4 (OT)	2.7
5-1(+)	"	1.8	1.7
T, Top (-)	"	2.8	2.7

OT - Out of Tolerance

4. Deposition thickness was not recorded at operation 3150. In reviewing previous history the run number 1984 which was the same for the Protoflight substrate used indicates that the lab log book for Run number 1984 recorded a thickness of 2000 angstroms on October 8, 1978.

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 3-29-82

PROCURING ACTIVITY NO.: 0

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
PF, F, & S	11323	TM	W-146

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50959	B	---

9. TITLE OF DEVIATION/WAIVER
Permission to use HCT detectors made without released planning.

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Det. Array Band 6, HCT

16. PART NO. OR TYPE DESIG.: 50959

17. LOT NO.: 4

18. QTY:

19. RECURRING DEVIATION/WAIVER: [ ] YES [ ] NO

20. EFFECT ON COST/PRICE
> 20,000,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE
> 1½ years if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
All of the HCT detectors made for use in the PF, F, and S CFPAs were fabricated and tested without released planning and proper quality and Air Force inspections. These detectors were processed as lot #4 and bear the serial numbers V-29-G-XXX where XXX is a three digit number. This waiver requests permission to use these detectors.

24. NEED FOR DEVIATION/WAIVER
These detectors have been fully tested and meet all qualification test requirements. These detectors have already been incorporated in the PF & F units and replacement is not deemed to be cost or schedule effective.

REA D.M. Randall 3/29/82 SYS ENGR for J. Engel 4/2/82 RE 4/1/82 QA 4-1-82 PE 4/1/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
002

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: for J. Engel 4/2/82 TITLE: Mgr. Systems Engineering

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC.

SIGNATURE: George B. Scott DATE: 4/5/82

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. H

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-152

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50958	B	---

9. TITLE OF DEVIATION/WAIVER
Permission to use non-conforming InSb Detectors

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [ ] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
InSb Detector Arrays

16. PART NO. OR TYPE DESIG.
50958-G

17. LOT NO.

18. QTY
3

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Greater than $100,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE
3 months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to use InSb Detector Arrays SN 906-3316-13 #66 and 102, and 906-3316-11 #114. These arrays have oxide chips and cracks at their edges. The chips that represent potential loose particles will be bonded in place using 2216 epoxy after the array is bonded on the FPA. These arrays were on waivers 132 and 133 for use on the F-1 CFPA.

24. NEED FOR DEVIATION/WAIVER

These arrays are the best candidates for the spare CFPA. New lots of InSb detectors have not yielded good arrays and there is not any firm data that indicates good arrays will result from lot 24 presently being processed.

REA D M Randall 4/20/82 SYS ENGR C Jensen for 4/20/82 RE [signature] QA [signature] PE [signature] 4/20/82 CMO [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
004 5i065 SN 004 ONLY

26. SUBMITTING ACTIVITY APPROVING SIGNATURE
[signature] for J Evans 4/20/82

TITLE SYSTEMS ENGINEERING

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE George B. Britt DATE 4/22/82

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 6 May 1982

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
David M. Randall, Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-153

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN / 8. DRAWINGS AFFECTED

	7. MFR. CODE	7. SPEC./DOC. NO.	7. SCN	8. MFR. CODE	8. NUMBER	8. REV.	8. NOR. NO.
a. SYSTEM							
b. ITEM				11323	50958	B	--
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Permission to use InSb Detectors from Lot 24 Wafer 21

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

12. CD NO.: II

13. DEFECT NO:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
InSb Detector Arrays	50958-B	24	20	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
None if approved -

21. EFFECT ON DELIVERY SCHEDULE
None if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER

This waiver requests permission to use InSb Detectors from Lot 24 Wafer 21 without a released process specification and released planning. This waiver further requests permission to use these detectors with out of specification 5% spot scan contours and crosstalk. A copy of the test data is attached.

24. NEED FOR DEVIATION/WAIVER

Due to the urgent need for new InSb Detectors, lot 24 was processed on unreleased planning. Spotscan and crosstalk data is setup/equipment limited. The physical measurements of the detector areas are in tolerance and InSb Detectors have exhibited optical sizes within .0001" of physical measurements. Historically, InSb Detectors have not had a problem with crosstalk.

5/6/82

REA D.M. Randall 5/5/82 SYS ENGR J.L. Engel PE 5/6

RE 5/6/82

QA 5/6/82

CMO 6/2

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 004 & Subsequent

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: M. Parker TITLE: Minor - System Engineering; Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY

SIGNATURE: Paula L. Burnett DATE: 6/7/82

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 6-24-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: David M. Randall, SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-161

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50973	B	3895A, 2870A

9. TITLE OF DEVIATION/WAIVER: Spectral Response Band 5

10. CONTRACT NO. & LINE ITEM: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [ ] MINOR [X] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: CFPA

16. PART NO. OR TYPE DESIG.: 50973-B

17. LOT NO.: 301

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: >100,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: 6 months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use CFPA with a Band 5 detector that does not meet system spectral flatness specification. Ref HS 236-8039 attached.

24. NEED FOR DEVIATION/WAIVER

Focal Plane is complete. To change detectors would require a new lot of InSb detectors to be processed and the Band 5 detector to be removed from the FPA. This would be costly and risky to the FPA.

REA David M. Randall 6/24/82 SYS ENGR J. E. Engel RE J. Thomas 6/24/82 QA M. [illegible] 6-24-82 PE Louis A. Blume 6/25/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

SN 004 ONLY CMO

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. W. Phillips 6/25/82 TITLE: Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY | SIGNATURE | DATE

DD FORM 1694

Program Instruction 010

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REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 6-28-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: R. Wengler
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[X] FUNCTIONAL	[ ] ALLOCATED	[ ] PRODUCT	[ ] YES [X] NO
F-1	11323	TM	W-162				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM	GSFC	400.8-D-210		11323	51065	H	EOS 4257A, 3
b. ITEM							
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER: Band 5 to Band 7 Misregistration

10. CONTRACT NO. & LINE ITEM: NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: | 13. DEFECT NO.: | 14. DEFECT CLASSIFICATION: [ ] MINOR [X] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: CFPA

16. PART NO. OR TYPE DESIG.: 50973-B

17. LOT NO.:

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: >>$1,000,000

21. EFFECT ON DELIVERY SCHEDULE: 1 year

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: Misalignment must be corrected for in data processing.

23. DESCRIPTION OF ~~DEVIATION~~ WAIVER: Section 3.2.4 of specification GSFC 400.8-D-210 requires that bands 5 and 7 shall be registered within 0.2 pixel. Failure report F5777 states that in the F-1 system bands 5 and 7 are 26.25 IFOV's apart or registration is within 0.25 IFOV However HS236-8026A states that the displacement from nominal position in the along scan direction is -0.132 IFOV for band 7 and +0.099 IFOV for band 5. Thus, the total misregistration is 0.231 IFOV. (HS236-8026A attached)

24. NEED FOR ~~DEVIATION~~ WAIVER: To proceed with the F-1 system having the band 5 to band 7 registration exceeding the allowable tolerance by 0.031 IFOV.
To correct the discrepancy would require rework of the Cooled Focal Plane.

REA [signature] SYS ENGR [signature] RE [signature] 6/
QA [signature] 6-29-82
PE [signature] 6-

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 51065 S/N 003 only

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature] TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY | SIGNATURE | DATE

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 6-29-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323	TM	W-163

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50973	B	3895A, 2870A

9. TITLE OF DEVIATION/WAIVER
Spare CFPA FET Offsets

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF DEFECT

12. CD NO. II

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: CFPA

16. PART NO. OR TYPE DESIG.: 50973

17. LOT NO.: 301

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
$50,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE
2 months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
NONE

23. DESCRIPTION OF DEVIATION/WAIVER
Permission to use CFPA with FET offsets > 10mV Band - 7 Ch 7 & 15 per FR8213

	Ch 7	Ch 15
Offsets prior to failure - 5/5/82	9mV	9mV
Offsets time of failure - 5/24/82	12mV	14mV
Offsets most recent date - 6/25/82	10mV	12mV

Cause of change in offset is unknown; most likely due to electrical discharge.

24. NEED FOR DEVIATION/WAIVER

Focal Plane is complete. To replace FETs would require crosstalk shield to be removed. Past experience with these FETs has shown that once offsets have changed, they are stable within a few mV thereafter. No system specification will be affected. The additional offset can be easily tolerated by the preamp. Rework is not considered cost effective.

REA D M Randall 6/29/82 SYS ENGR [signature] 6/29/82 RE [signature] 6/29/82 QA [signature] 6/29/82 PE [signature] 6-29-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
004

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE [signature] TITLE SYSTEMS ENGINEERING

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY SIGNATURE DATE

DD FORM 1694

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 6-30-82.

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Spare	11323		W-164

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.
11323	50973	B	3895A, 2870A

9. TITLE OF DEVIATION/WAIVER: Deleted Pull Test Spare CFPA

10. CONTRACT NO. & LINE ITE: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: CFPA

16. PART NO. OR TYPE DESIG.: 50973-8

17. LOT NO.: 301

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: $50,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: 2 months if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: NONE

23. DESCRIPTION OF DEVIATION/WAIVER

Permission to use spare CFPA without performing non-destructive pull test of .001" dia gold wire bonds to FETs, resistors, and capacitors. Planning calls for 10% of these bonds to be pulled to 1.5 grams.

24. NEED FOR DEVIATION/WAIVER

The AHR operations that call for pulltest/inspection/MCI are not signed off as completed. To do so at this time would require removal of the crosstalk shields which is difficult and risky. Past history with the PF & F FPAs shows that the risk of a poor wirebond to these components is very small.

NOTE: There were two wire bond failures on the Protoflight Unit and no failures on the Flight Unit. The Wire Bond percent defective for these two units is less than two tenths of a percent.

REA D M Randall 6/30/82 SYS ENGR J L Engel RE [signature] QA [signature] PE [signature] 7-5

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER

S1065 SN 004 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE

TITLE: Minor - Systems Engineering
Major - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY

SIGNATURE

DATE

DD FORM 1694

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HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 2387

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 | 2. CLA | 3. MODEL: FLT | 4. TIME OBSERVED: 1900 | 5. DATE OBSERVED: JAN 28 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY		50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☒ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMPERATURE 73 °K ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ DISCRP ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 5 CH. 13 OFFSET >.010 ; = .013 VDC. BAND 5 CH. 4 NO RESPONSE TO INJ. FREQUENCY. BAND 7 CHANNELS 3, 7, 9 AND 12 HANG NO RESPONSE TO INJECTED FREQUENCY

15. TEST PROCEDURE: 16192 PARA 4.4.4.6 | 16. ORIGINATOR: N. C. DAVISON II ORG 2213 DATE 1-29-81 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: No ANOMALIES OCCURRED. UNIT WAS IN NORMAL TEST CONFIGURATION. OUTPUTS ARE FED THROUGH HIGH IMPEDANCE CIRCUITRY LIMITING CURRENT TO OTHER DEVICES.

18. FAILED ITEM NAME AND PART NUMBER: U.S. Mixer 50958

23. ☐ FOLLOWING REWORK/RETEST REQUIRED REWORK/RETEST NOT REQUIRED (EXCUSED): Units were retested per supplement #2 Band 5 detector failed, ref TR 2667. Band 7 detector failed ref TR 2665.

21. AUTHORIZATION: [signature] ORG 2121 DATE 1/29/81 | ☐ CONTINUATION EXCEPTED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: Units were retested per supplement #2 Band 5 detector failed, ref TR 2667 Band 7 detector failed; ref TR 2665

24. QA REJECT

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
50958 Band 5		906-3316A-1-89				
50958 Band 7		906-3316A-13-127				

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: Cause was electrostatic discharge. Parts were sent to TSO for failure analysis. A copy of this report, ref TR 1641, is attached. Static discharge precautions were revised and recommendations have been implemented.

33. FRB CLOSURE: [signature] 2/27/82

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☒ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/PAD ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ UNKNOWN ☒ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2121 DATE 2/10/82

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 22-41 DATE 2/22/82

39. RELIABILITY ____ ORG ____ DATE ____

40. CUSTOMER REP ____ DATE ____

HUGHES

F 2387

TECHNICAL INTERNAL CORRESPONDENCE

TO: D.M. Randall
21-23

DATE: 07 July 1981
REF: 7611.40/1

SUBJECT: Failure Investigation of InSb Photovoltaic Detector

FROM: F. Reizman
76-11-44

BLDG. 6 MAIL STA. C136
EXT. 6343

ABSTRACT:

Failure analysis was performed on a photovoltaic InSb infrared detector, which was suspected to have been damaged by electrostatic discharges. Three diode channels (out of sixteen) were electrically degraded, without visible signs of damage.

Surface metallization was removed by RF sputtering in argon. No distinguishing features were visible on the damaged diodes until sputtering had proceeded below the metal/oxide interface. Two of the three degraded diodes then showed distinguishing features, whose form and location very strongly suggest that they are sites of electrostatic damage which caused the diodes to fail.

A discussion of the analysis methods, including sputter-etching, is given in an appendix.

F2387

I. INTRODUCTION

Several photovoltaic InSb detector chips were submitted to TSD for failure analysis. Several diodes (channels) out of sixteen in each chip had been shorted or degraded, without any visible change in their microscopic appearance. (Figure 1 shows the overall layout of the chip.) SBRC strongly suspected that the degraded performance of these diodes was due to electrostatic damage (ESD). [Ref: SBRC Internal Memo HS236-7391, dated 12 March 1981.]

Since electrical measurements of the diode characteristics could be made only at 90°K or below, TSD confined its failure analysis to optical and electron-beam microscopy.

In an attempt to locate the damage more precisely, an ultrasonic cutting probe with tungsten-carbide point was used to cut conductor traces near the diode region. After cutting the trace, the bonding pad tested "open" with respect to the substrate, both on degraded and good channels. This shows that there was no shorting through the thick oxide, but that the electrical damage was at or near the junction.

Metal and oxide coatings were stripped in an effort to find evidence relating to the cause of failure. In the following pages we describe the investigation and the resuls which strongly suggest ESD as the cause.

F 2387

II. DEVICE AND COATING STRUCTURE

The device substrate is indium antimonide (InSb), which is coated in succession with:

1) a thin proprietary passivation layer
2) a thin evaporated SiO (inner rectangle)
3) A thicker SiO (outer area). On this thick oxide most of the conductor traces and wire-bonding pads are coated.
4) Thin metallization: titanium (several hundred Å) for adherence, followed by about 3000 Å of gold.
5) Thick metallization: consists of the thin Ti/Au above, covered by another Ti/Au double layer about twice as thick, giving a total thickness of about 1 μm. Thick metallization is confined to the area near the diode and is used to span the sheer step from thick to thin oxide.

Each diode is formed by a mesa in the central area. The mesa is oxide-covered, except for a contact window that gives access to the metallization. A rough appearnace in the center of this contact window marks the thin palladium coating which improves electrical contact with the Ti/Au conductor trace. A cross-section of the chip taken through a typical diode is shown in Figure 2. This diagram is obtained mostly by interference microscopy supplemented by ordinary optical microscopy and information from SBRC. Further discussion is reserved to Appendix A.

The appearance of the of the devices as received is shown in Figures 3, 4, and 5. Figure 5, taken on the Band 5 chip, shows metal films with "frills" or "pie-crust" edges. These are formed as a result of the photoresist liftoff process that defines the metal patterns. Figures 4 and 5 also show the difficulty of getting good metal coverage over the sheer oxide step.

F2387

III. STRIPPING OF COATINGS

Optical examination, both at SBRC and TSD, showed that no visible signs of electrical damage were present. It was therefore thought necessary to remove the metallization, and possibly part of the oxide, to expose the site of the damage and have a reasonable likelihood of making it visible.

Chemical etching was at first tried, using potassium iodide to remove gold, and a preparation containing HF for the titanium. Further details are given in Appendix B. This approach failed because of formation of a bulky corrosion product on contact with InSb. As a result, no useful information was obtained from the Band 5 chip.

To avoid these difficulties, RF sputter etching was then tried. This technique subjects the sample to an RF glow discharge in argon, which removes material by ion bombardment without chemical reactions. By this relatively clean method, metallization was removed and ESD sites located. Further details about sputter-etching are given in Appendix C.

IV. RESULTS

Figures 3, 4, and 5 are representative of the diodes as they appear in the as-received condition. Careful optical examination at SBRC and TSD, and SEM examination at TSD, failed to show any systematic differences between diodes 7, 9, 12 (degraded) and the nine remaining (undamaged) diodes.

Sputter-etching was then carried out for a total of 190 minutes in several stages. After 190 minutes the optical views (Figures 6, 8) show a small amount of titanium remaining of the thick metallization. Figures 7 and 9 show roughly the same areas in SEM view. The small amount of titanium is thin enough to be penetrated by the electron beam, so that Figures 7 and 9 are basically pictures of the oxide. Nevertheless, no characteristic trace of ESD can be seen at this point. Although some oxide has been sputtered away in the unmetalized areas, the covering of titanium still preserves the oxide in the diode areas originally coated with thick metallization.

F 2387

After an additional two hours of sputter-etching, however, diodes 9 and 12 have developed "new" features which do not appear in any of the others. Diode 12 now shows a notch in one edge of the mesa (Fig. 10, 11, 12), while diode 9 shows linear markings (furrows) at two mesa corners (Fig. 13, 14, 15, 16). Figure 16 should be compared to a picture of known ESD published by A. Trigonis* (Fig. 17).

The association of these features with ESD is supported by the following arguments:

1. The features are seen near the edge and corners of the mesa, where the junction reaches the surface and electric fields are strongest. Junction curvature and discontinuities in dielectric constant combine here to raise the field strength above its average value, and create local breakdown.

2. Since the surface is covered with SiO and metal, all breakdown takes place in the oxide under the electrodes. Unless enough energy is liberated to disturb the outer surface, the damage will not be visible until the metal is removed and oxide etching reaches the damaged region. Then a difference in etch rate may create an "etch pit", analogous to preferential effects in wet-chemical etching. The belated appearance of these features is therefore suggestive of a low-energy ESD.

3. No such features appeared at the same time on undamaged channels. It must be admitted that channel 7 does not show such features, so that the correspondence is not bidirectional. However, the subtle nature of ESD makes it plausible that channel 7 has damage too slight for the preferential etch to reveal, but nevertheless electrically important.

CONCLUSIONS

1. The anomalies at the edge of the mesa in channels 9 and 12 are probably associated with ESD, and to this extent the hypothesis of ESD on the failed detectors is confirmed.

* Proceedings, 1976 Reliability and Maintainability Symposium, p. 165

F 2387

2. Sputter-etching in argon is a practical method of removing metallization from InSb devices. As used in the Thin Film Lab at TSD, however, the slow etch rate for titanium is a disadvantage. Better vacuum technique could improve this, however, and make etch rates for active metals closer to those for noble ones.

3. When using sputter-etching as a means for stripping coatings, it is important in interpretation to allow for changes of surface feature form and topography. These include the following:
   (a) preferential attack at vertical surfaces
   (b) formation of a groove at a mesa foot
   (c) appearance of a raised relief image of a metal trace after the metal is etched away. This relief is left because oxide was etched in the bare areas, but was masked by the metal. Chemical etching, in contrast, usually removes metals without appreciably etching the oxide. In consequence, after metal is sputter-etched off, the oxide topography is more complex than it was before the metal was applied.
   (d) V-grooving of fine cracks.

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APPENDIX A: Interferograms

The height of surface features and thickness of thin films can often be measured under the microscope by optical interferometry. This method has several advantages over profilometers (e.g., Dektak, Talysurf):

1. Thicknesses or heights are obtained in terms of a wavelength of light, whose value is fixed by nature. There is no need to calibrate.
2. Data is automatically obtained over a two-dimensional area, rather than along a linear track. A photograph can serve as a compact record of a great many local heights.
3. It is often possible to find the thickness of a transparent film if the index of refraction is known, even if there is no hole or step.

In Figure 2, an index of 1.9 was assumed for SiO, and used for thickness in the central region. For the thick oxide areas, it was possible to check this value using several chipped areas near the edge where the InSb substrate was exposed. There was good agreement with measurements of the step height.

The measurements in this work were made using a Watson Interference Objective adapted to a Reichert microscope. Other companies make instruments very convenient for shop use in evaluating surface finishes or scratch depths. Figure 18 shows a typical micro-interferogram used in making measurements for Figure 2. The fringes are at intervals of .29 μm (a half-wave of yellow light).

Somewhat related to interferometry is the Nomarski objective. While Figure 18 quantitatively shows heights, Nomarski contrast indicates slopes. Thus it is good for showing the vertical dimension in a qualitative way, making surface contour easy to visualize. Most of the optical micrographs in this report were made with Nomarski contrast.

F2387

APPENDIX B: Chemical Etching

Following the usual practice for silicon IC's, attempts were made to strip metallization with chemical etchants. Figure 19 shows a typical diode after removal of the external gold layers with a potassium-iodide solution. Small amounts of gold remain in several areas, while the oxide is completely untouched. The intermediate titanium protects the inner gold layer in the thick-metallization area. The inner gold could not be removed until an application of "Sapp etch" penetrated the titanium.

Unfortunately, the second application of KI etch came into contact with bare InSb in the now-open contact window. A purple-black, bulky corrosion product was formed which obscured detail near the edge of the window, an area in which ESD effects could be expected. After an unsuccessful trial on the Band 5 detector, the chemical stripping approach was abandoned.

Gold Etch	
Water	250 ml
KI	25 g
I	19.1 g

"SAPP Etch" for Ti	
HF	1-3 ml
HNO_2	2-6 ml
water to make	100 ml

F2387

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APPENDIX C: Sputter-Etching

Sputter-etching was done by RF sputtering in the Thin Film Laboratory, by D. E. Blackmon, through the cooperation of J. F. Linder.

The sputtering action is completely physical, by argon ion bombardment, so that no corrosion products are formed. The erosion or "etch" rate tends to be faster for noble metals like gold than for active metals, unless the partial pressure of oxygen in the system is very low. In a "dirty" system, active metals tend to sputter almost as slowly as oxides.

There was in fact a large difference in the sputtering rates of the gold and titanium layers. The vacuum before admission of argon was said to be about 6×10^{-6} Torr, and the argon pressure 5×10^{-3} Torr. RF voltage was 700v and power about 200 watts. We noticed considerable differences in time needed to sputter away metallization on the actual and practice samples. These differences might have been due to accidental air leaks or differences in heat sinking.

As sputtering proceeds, certain changes occur in surface topography which are different from those seen in chemical etching.

1. Vertical surfaces are eroded faster than horizontal ones, due to an angle-of-incidence effect. Ion bombardment is actually more effective at removing material if it is oblique rather than perpendicular. This results in mesa edges moving back but remaining steep. A groove was seen to appear at the foot of the mesa after prolonged sputtering, perhaps due to argon ions reflected obliquely from the mesa slope (Figures 7, 11, 12, 14).

2. A wire close to the surface of the sample can be seen to cast a sharp vertical "shadow" (Figure 20).

3. Fine cracks, originally only about 0.3 μm wide, were "gouged" out in V-groove form after prolonged sputtering (see Figure 21). Certain conical pits, of perfect geometrical form, may have similar origin by enlargement of a fine pinhole (Figure 22).

F2307

Figures 20 and 21 show where a crack has been emphasized by sputtering, except where it crosses the "shadow" of a lead wire. This crack was produced accidentally by TSD while mounting the chip in silver-epoxy, and extends completely through the chip.

F. Reizman

F. Reizman

Approved: S. L. Webster

S.L. Webster, Head
Component Reliability Section

F2387

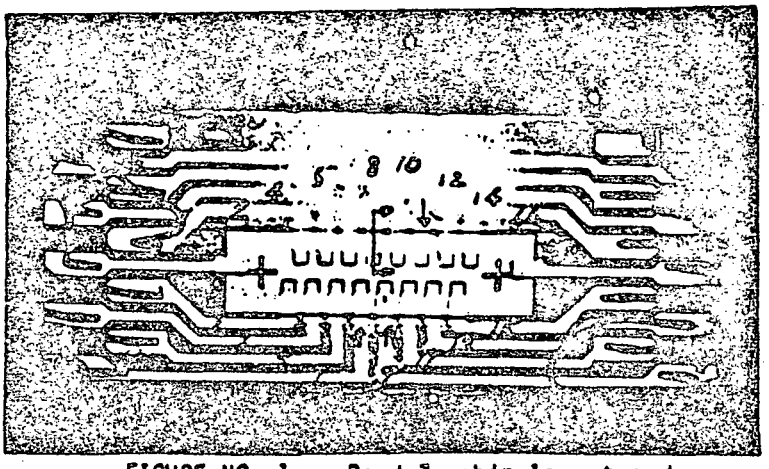

FIGURE NO. 1. - Band 7, chip layout and numbering system. This thin-oxide region, containing the diodes, is in the inner rectangle. The section line marks the typical cross-section of Figure 2. The actual size of the central rectangle is about .375 x 1.36 mm.

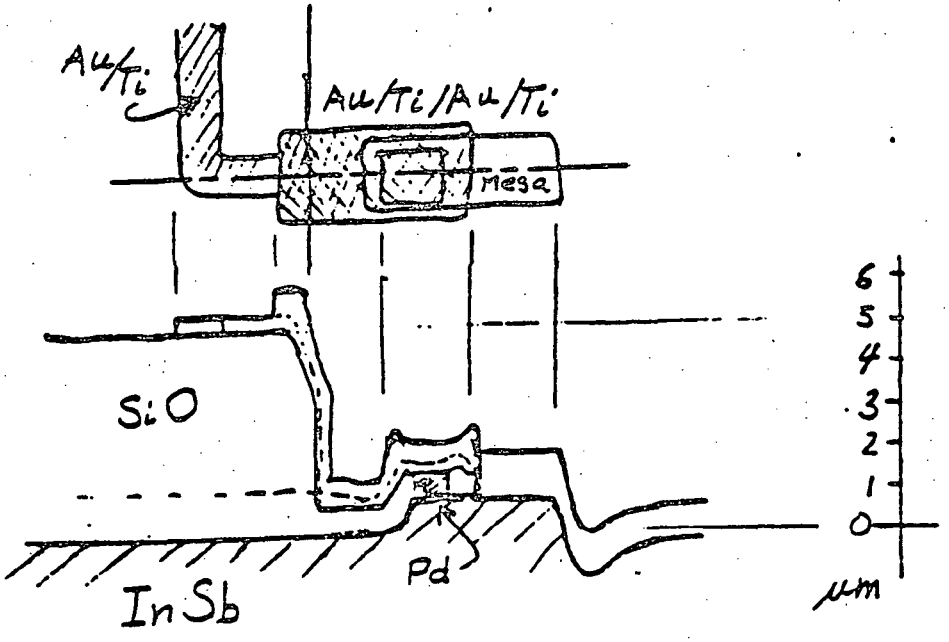

FIGURE NO. 2. - IR Detectors - Coating structure from interferometry.

F2387

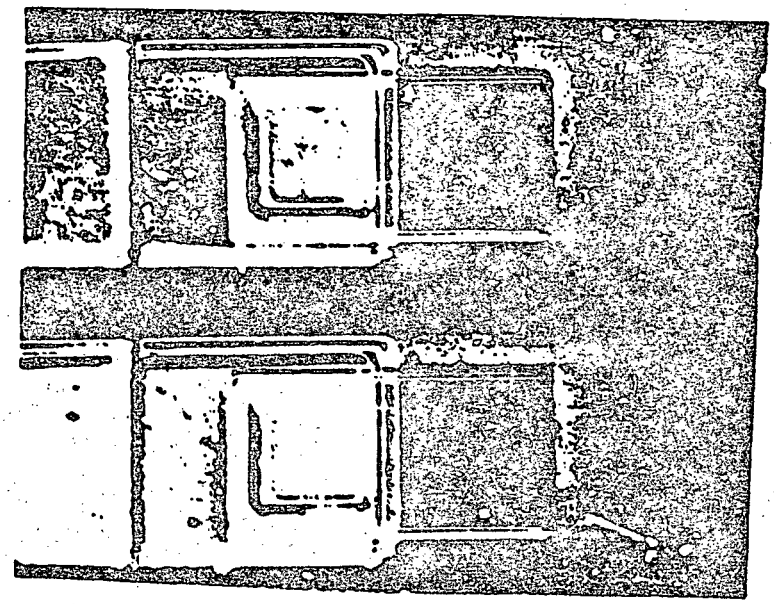

FIGURE NO. 3

Channels 10 and 12, as received, Nomarski contrast.

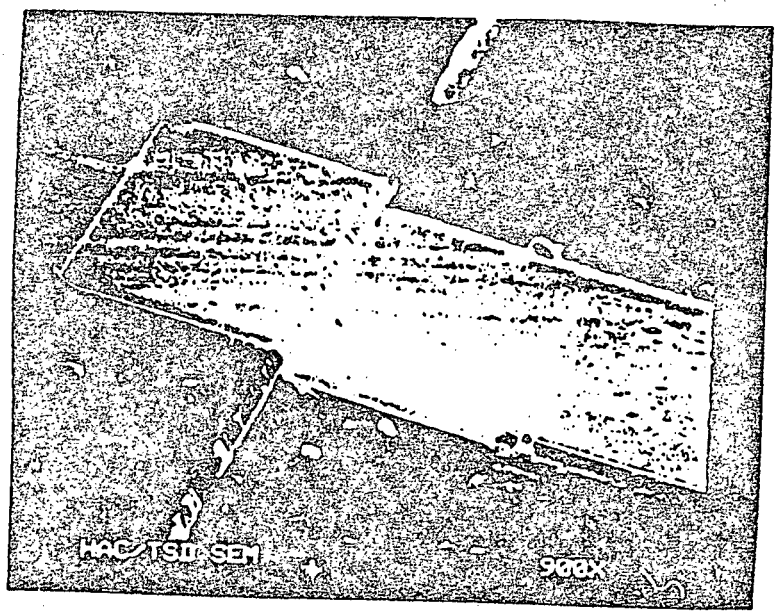

FIGURE NO. 4

SEM of typical diode as received, showing coverage at step and thickened metallization

F2387

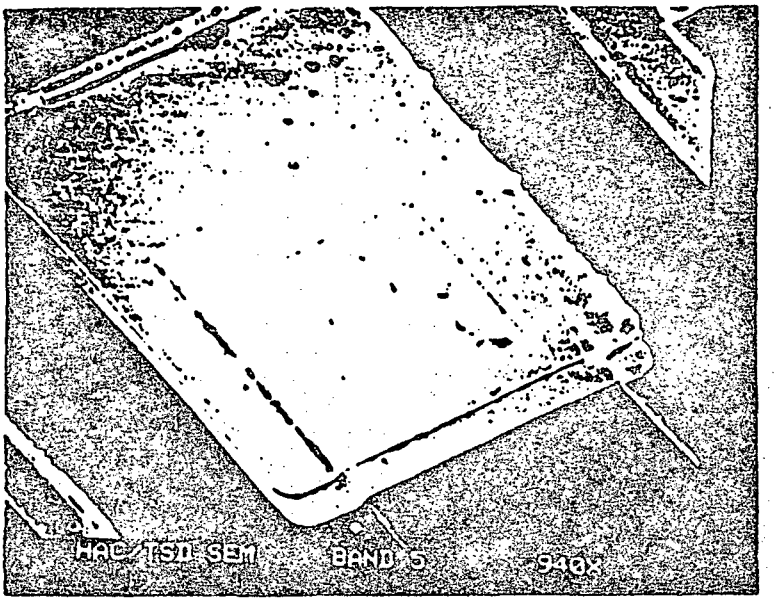

FIGURE NO. 5

Typical diode, Band 5, as received. Clearly shows double metallization, frills at metal edge, possible continuity problem at oxide step.

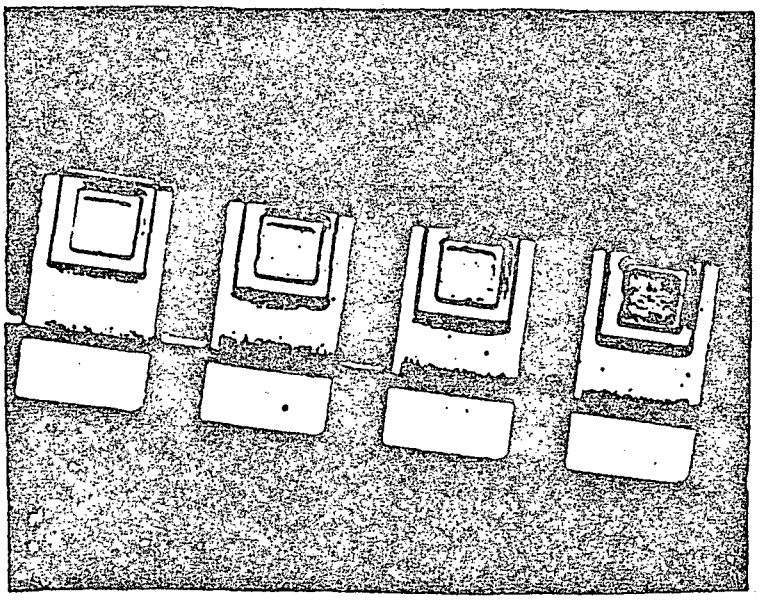

FIGURE NO. 6

(190 minutes sputter etch) Optical micrograph showing channels 5, 7, 9, 11 (from left). Seven and nine are electrically damaged. Note remaining Ti metal in area of diode; conductor traces are now marked by raised area.

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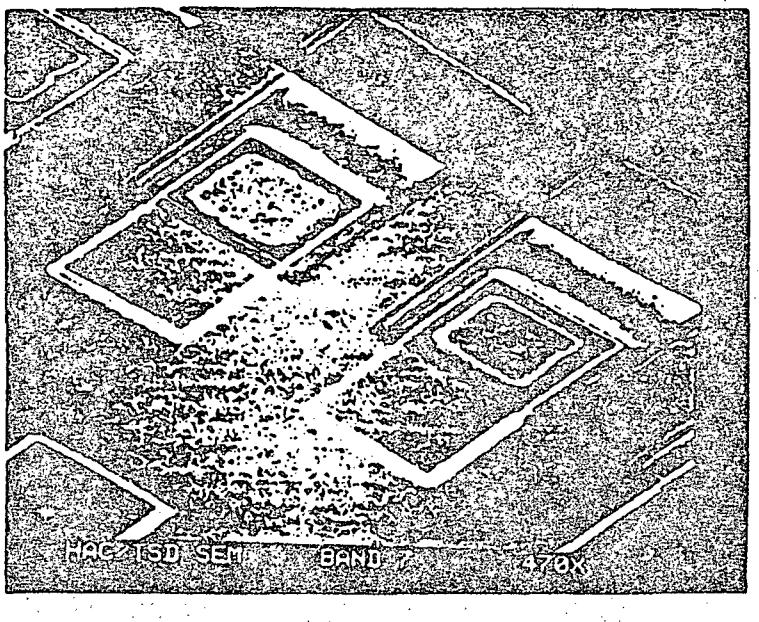

FIGURE NO. 7

(190 minutes sputter etch) Nearly same area as Figure 6. SEM view showing channel 7 and 9 in center. Oblique view shows groove around mesa. A small amount of residual gold (inner layer) appears at foot of oxide step.

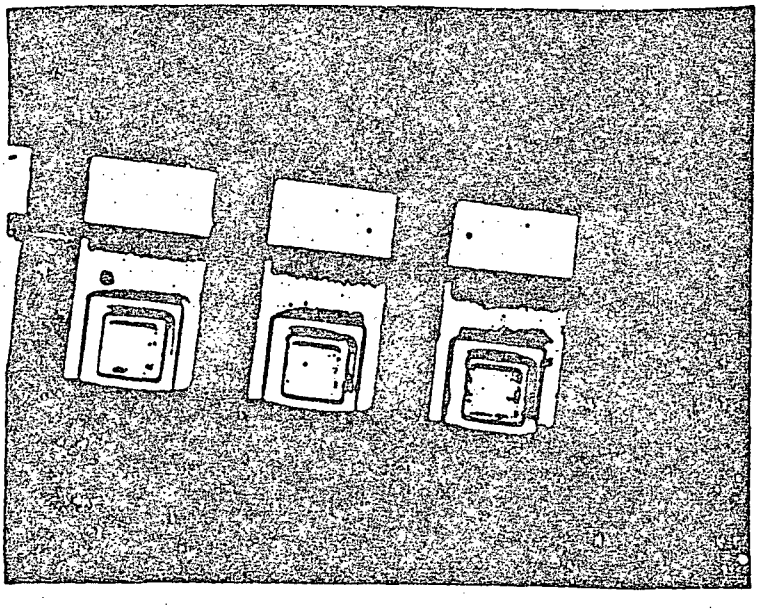

FIGURE NO. 8

(190 minutes sputter etch) optical view showing channel 12 (damaged), 14, 16 from left. Residual gold shows dark in optical, light in SEM views.

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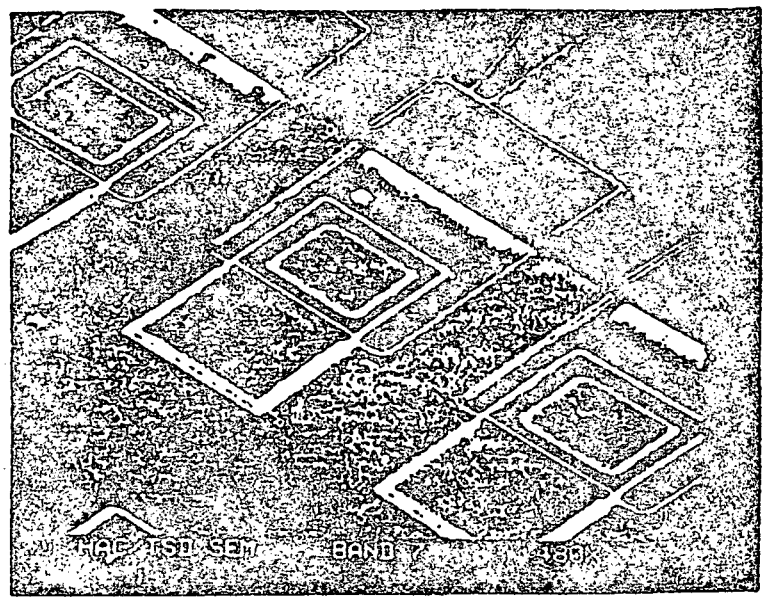

FIGURE NO. 9

SEM showing nearly same area as Figure 8, channel 12 in center. The spot (arrow) on channel 12 is a small area of residual metal probably due to shielding by a dust particle during sputtering.

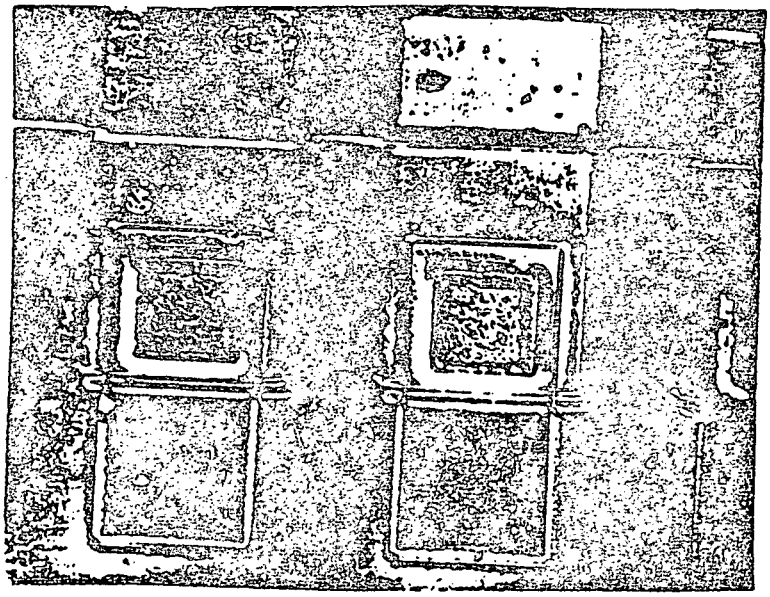

FIGURE NO. 10

310 minute sputter etch, channel 12 (left) and channel 14, optical with Nomarski contrast. A notch has appeared in the left side of the mesa of channel 12.

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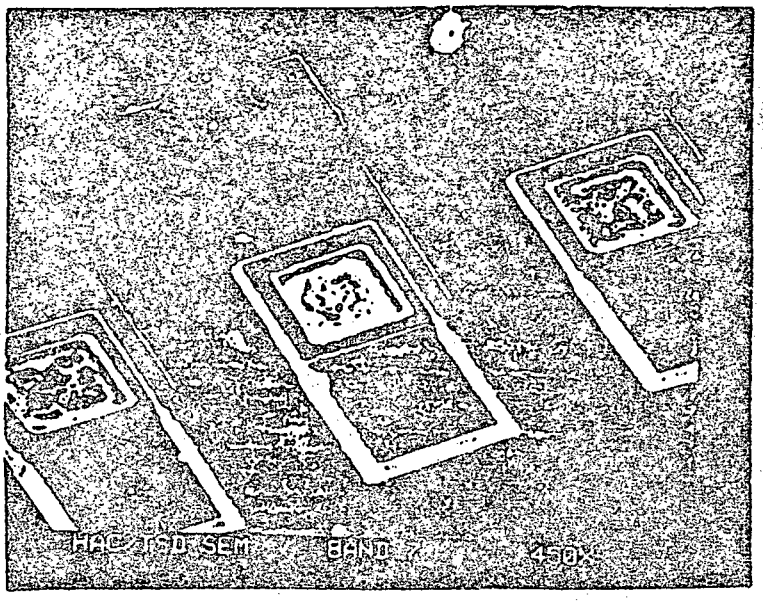

FIGURE NO. 11

Same area as Figure 10, SEM. Channel 12 in center. The notch is clearly shown; note also a deeper groove around the mesa than that visible after 190 minutes.

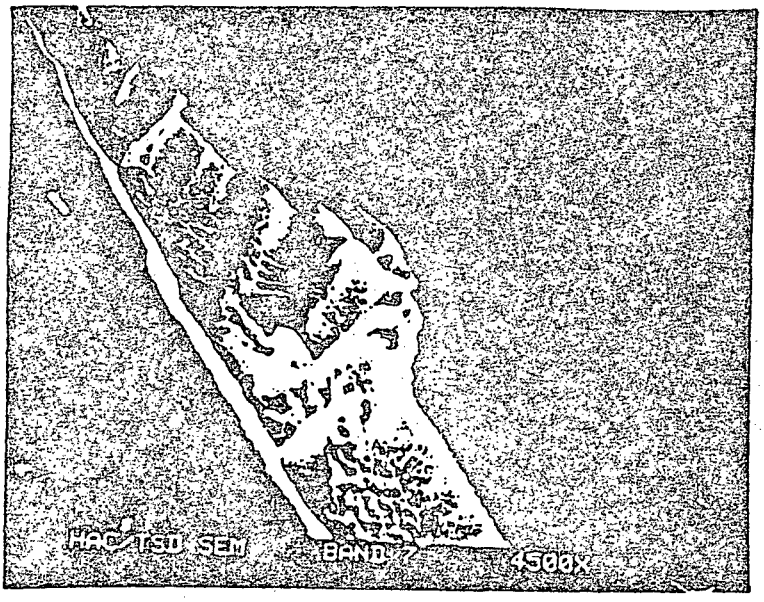

FIGURE NO. 12

Shows the notch under higher magnification.

F2387

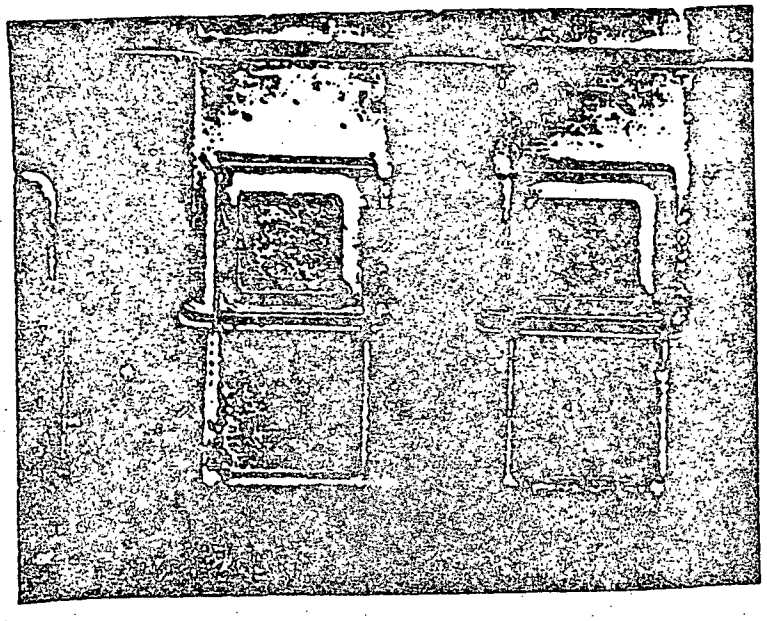

FIGURE NO. 13

Optical, channels 11, 9, 7 (from left). Note damage on channel 9, at left edge and upper left corner of mesa. Nomarski contrast.

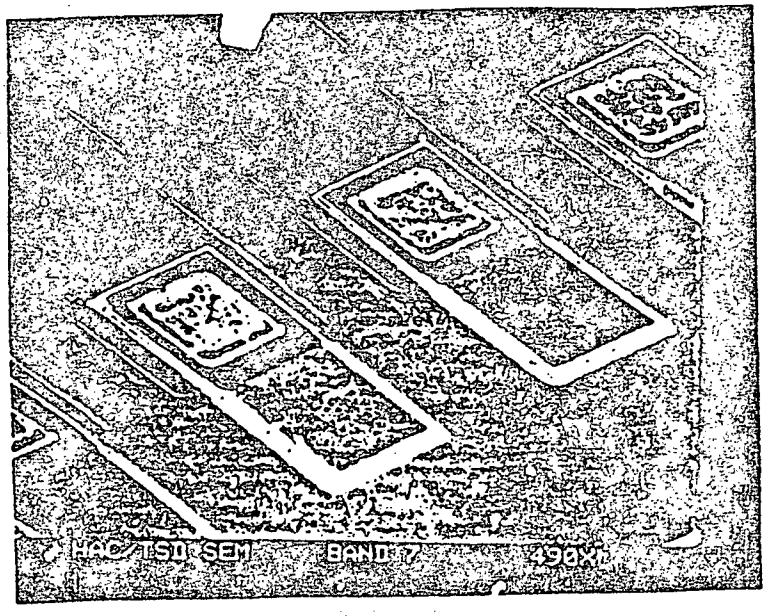

FIGURE NO. 14

SEM showing channel 9 and 7 in center. Same features are seen plus grooving around mesa.

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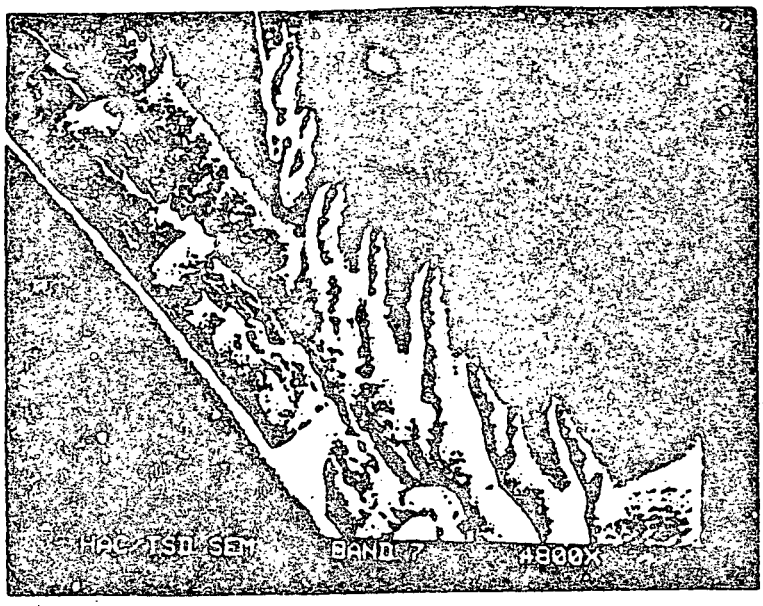

FIGURE NO. 15

SEM showing damage at left edge of mesa on channel 9 (compare Figure 14).

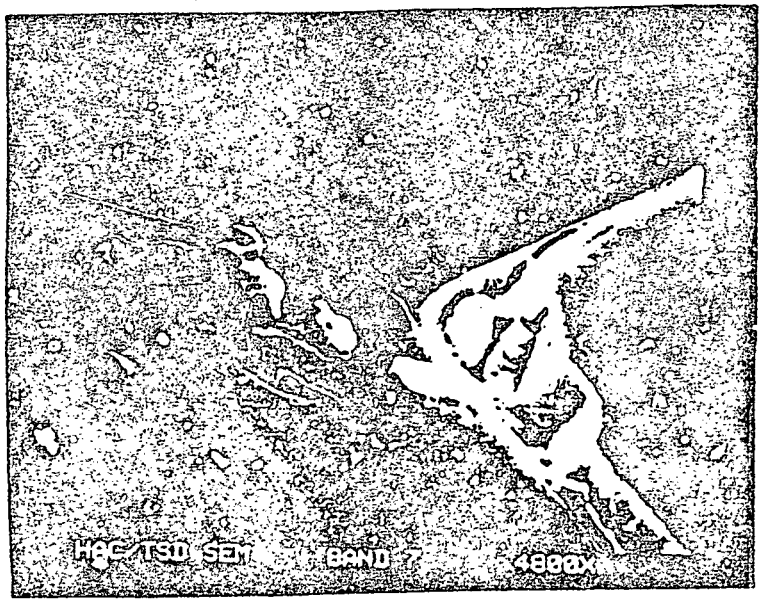

FIGURE NO. 16

SEM showing damage at upper left corner of mesa, channel 9 (Figure 14).

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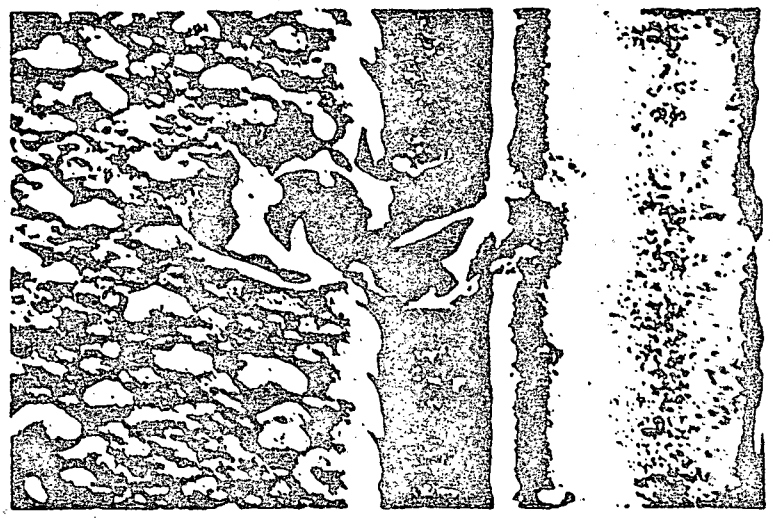

FIGURE NO. 17

Photo reprinted from Trigonis, Ref. 1, as an example of ESD. Compare to Figure 16.

(Original, 4300X)

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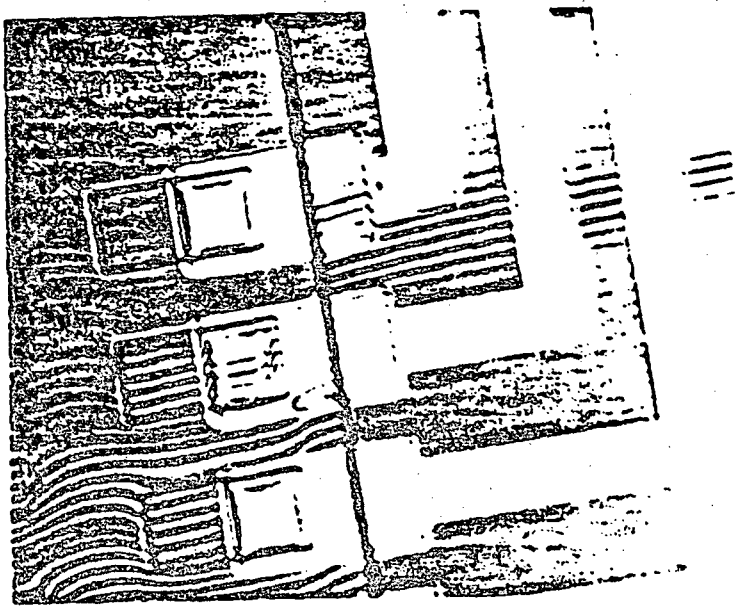

FIGURE NO. 18

A white-light interferogram on the as-received Band 7 chip. In the thin oxide at left, two fringe systems can be seen, from the oxide surface and one from the oxide/substrate interface.

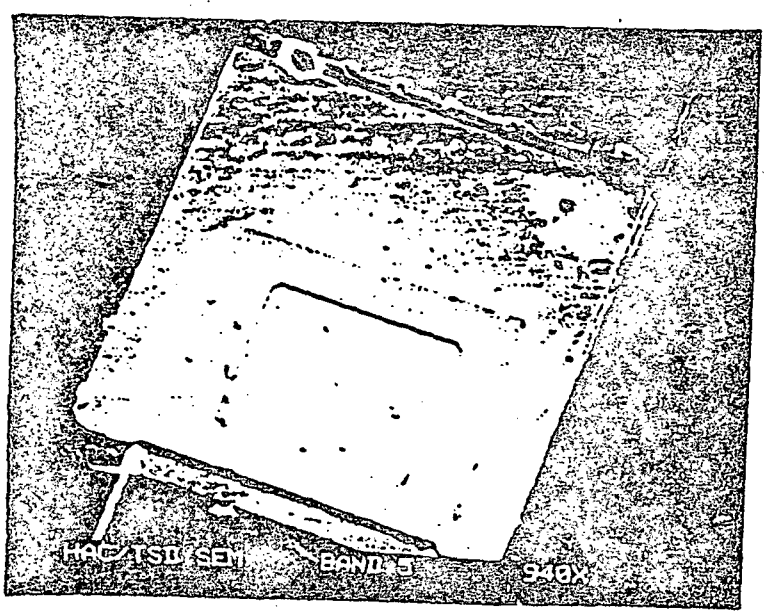

FIGURE NO. 19

SEM of typical diode after 45 seconds KI etch. Lighter granular material is residual gold. Remaining exposed metal is Ti; thicker area is Ti/Au/Ti sandwich.

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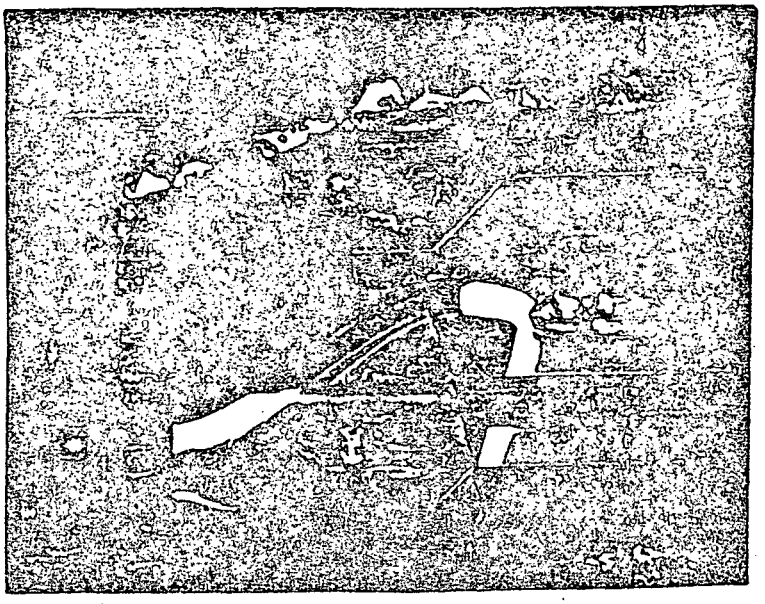

FIGURE NO. 20

Relief shadows of a lead wire, after several stages of sputter-etching. The wire was accidentally moved between stages. Some Ti remains in the last shadow. A crack appears, crossing the shadow. (Optical, Nomarski contrast.)

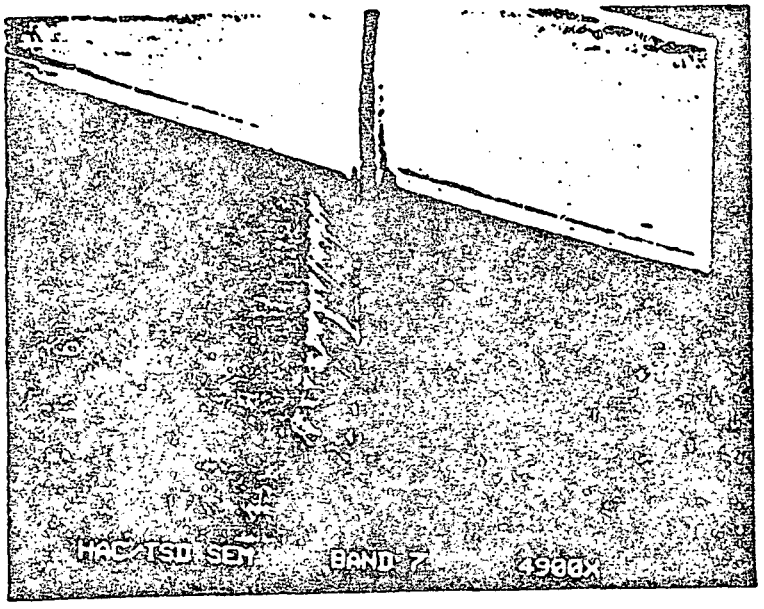

FIGURE NO. 21

SEM of crack seen in Figure 3 showing V-groove enlargement in sputtered area.

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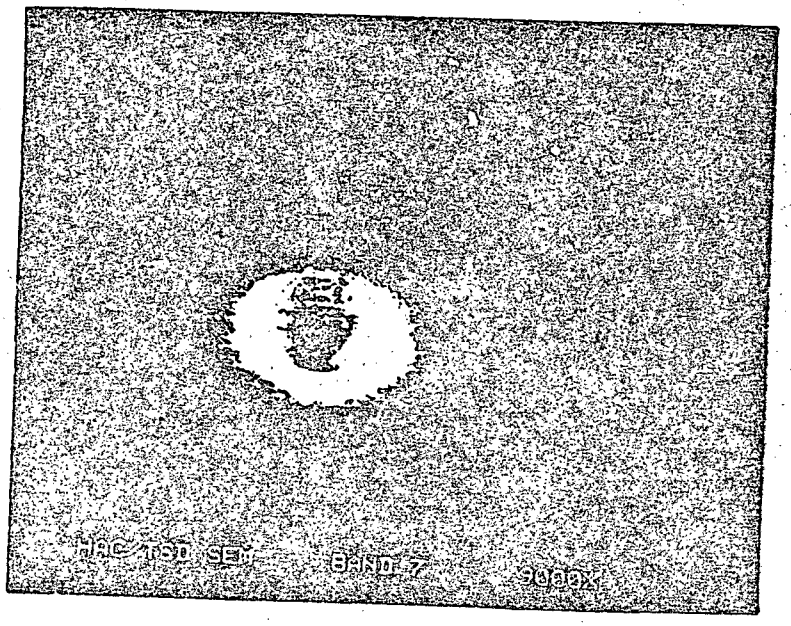

FIGURE NO. 22

Conical pit on mesa top after 310 minutes sputtering.

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 266

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011	2. GLA	3. MODEL: F	4. TIME OBSERVED: 10AM	5. DATE OBSERVED: MO 04 DA 19 YR 81	
6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART					

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT		[illegible]		
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAND 7/CFPA	[illegible]	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD		50723		
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMPERATURE 230 °K ☐ THERMAL VAC ____ HRS. AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: AT AMBIENT AND COLD TEMP. BAND 7 HAD A)-OOD RAIN CURRENT B)-SIGNAL AND REFERENCE CHANNEL HAVE THE SAME VOLTAGE FOR ALL CHANNELS

15. TEST PROCEDURE: 16192 4.4 [illegible] 16. ORIGINATOR: C R Lore ORG 2122 DATE 05-19-81 ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Problem found to be a defective resistor used to measure drain current. Verified not part of subsystem. No components were removed.

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Replacement in the equipment.

21. AUTHORIZATION: [signature] ORG 2122 DATE 5/21/81 ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Meter was replaced and unit was retested per 16192 para [illegible] 4.4 assembly.

24. QA REVIEW: N/A

25. QA APPROVAL

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY ____ ORG ____ DATE ____

28. RETESTED BY: MCD ORG 2122 DATE 5/20/81 ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Meter was defective and has been sent for repair.

31. FRB CLOSURE: [signature] 5/26

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 5/21/81

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 2261 DATE 5/26/81

39. RELIABILITY: [signature] ORG 5141 DATE 5-21-81

40. CUSTOMER OR SUPPLIER ____ DATE ____

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 2665

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM V011 | 2. CLA | 3. MODEL: FLT | 4. TIME OBSERVED: 4PM | 5. DATE OBSERVED: MO 05 DA 20 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☒ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	BAND 7/CFAA	50955	201	SARC
10. ☐ MODULE ☐ MICAM ☐ CARD		50973		
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☒ TEMPERATURE 92 °F ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ EMC/EMI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 7, CHANNEL 1 INJECTED SIGNAL FAGA. RESPONSE OUTPUT VOLTAGE OUT OF SPEC. 4.5mV AT 10 Hz. CHANNEL 7 OUTPUT VOLTAGE HIGH OUT OF SPEC. 19.4mV AT 10 Hz.

15. TEST PROCEDURE: 16192 | PARA 4.6 | 16. ORIGINATOR: C. R Lee | ORG 2213 | DATE 05-20-81 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED (CAUSES): Rework per supplement 5.

21. AUTHORIZATION: [signature] ORG 2122 DATE 7/1/81 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Reworked + Retested per supplement 5. Tested good. No other components were overstressed

24. QA: [signature] 7/1/81

25. QA RETEST: [signature] 7/1/81

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
50958						

27. REWORK BY ____ ORG ____ DATE ____ | 28. RETESTED BY ____ ORG ____ DATE ____ | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: 4.5mV @ 10Hz relates to a detector impedance of $6.7 \times 10^6 \Omega$ or a specification of $8.0 \times 10^6 \Omega$. 19.4mV @ 10Hz relates to an open detector. The open detector when caused by a crack in the SiOx coating causing the detector bias to open. Both failures are "infant mortality" problems not expected until the detector is assembled onto the FPA, wire bonded, and tested.

32. PRB CLOSURE: [signature] 7/2/81

11. ☐ CONTINUATION SHEET USED

30. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☒ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] ORG 2122 DATE 7/1/81

38. SPACECRAFT SYSTEM ENGR: [signature] ORG 22261 DATE 810702

39. RELIABILITY: [signature] ORG 57-41 DATE 7-2-81

40. CUSTOMER OR SUPPLIER: N.A. DATE

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SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 266

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TDRS
2. GLA:
3. MODEL: F1
4. TIME OBSERVED: 1100
5. DATE OBSERVED: 9 27 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

7. EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CHA	50973	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ ENCAPS ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE 96 °F ☐ AXIS FOR ☐ THERMAL VAC ☐ MIN ☐ TYPE ☐ HRS. AT ☐ OTHER

14. DESCRIPTION OF FAILURE: No output at Ch 3 & 8. Lower than expected signals from Ch 1 & 2 & 14 indicating problem in detector circuit

15. TEST PROCEDURE: 16192 PARA 4.6 | 16. ORIGINATOR: C. L. Lee | ORG: 22-13 | DATE: 09-28-81 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

16. VERIFICATION AND FAILURE ANALYSIS:

18. FAILED ITEM REMOVED AND PART NUMBER:

23. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace detector per supplement 3 and test per 16192 para. 4.6

21. AUTHORIZATION: [signature] | ORG: 2122 | DATE: 10/4/81 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: Detector was replaced and test successfully per 16192 para 4.6

23. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.
50958	(REMOVED BAND 5 ARRAY S/N #92				906-3316A-11)	
	(INSTALLED 11		S/N #116		4)	Q. Hubbs 10-5-81

27. REWORK BY: ORG: DATE:
28. RETESTED BY: ORG: DATE:
☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Detector was damaged by discharge of static electricity. Assy. Lab and Test Areas have been implemented with static safe guards.

33. FRB CLOSURE:

☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION:

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/PAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN
DEFECT CODE:

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2122 | DATE: 6/24/81

38. SPACECRAFT SYSTEM ENGR: [signature] | ORG: 22-41 | DATE: 5 Oct 81

39. RELIABILITY: [signature] | ORG: 51-41 | DATE: 10/7/81

40. CUSTOMER OR SUPPLIER: | DATE:

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SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

S 8018

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM | 2. GLA: VO 11 | 3. MODEL: 7 | 4. TIME OBSERVED: 11 PM | 5. DATE OBSERVED: MO 1 DA 21 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	CTPA	50973	201	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ PSD TYPE ____ ☐ THERMAL VAC ____ HRS AT ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Feedback loop Board 5 Ω13 measured open circuit when tested per engineer I per 1300 ATP 3.

15. TEST PROCEDURE: NONE per MRS | PARA | 16. ORIGINATOR: [signature] | ORG 2122 | DATE 7/21/81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Visual inspection revealed a poor solder joint on P11 substrate

19. FAILED ITEM NAME AND PART NUMBER: 50956

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Put P11 on CMR and repair per and test per MERCA 28457

21. AUTHORIZATION: [signature] | ORG 2127 | DATE 7/21/81 | 23. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: Repaired and tested per MERCA 28457.

24. QUALITY [illegible] 1/45

25. QUALITY [illegible] 1/45

No operation of any component possible, FEEDBACK LOOP HAS EXTREMELY HIGH IMPEDANCE NORMALLY. QVP

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Trace was scribed thru when cleaning up excess conductive epoxy used to bond P11 to circuit board. Operator told cautioned to use more care in applying and cleaning up conductive epoxy.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: [signature] 6/29/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2122	6/24/81	[signature]	2261	6/26/81
39. RELIABILITY [signature]	ORG 57-41	DATE 6-26-81	40. SUPPLIER OR SUPPLIER		DATE

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6/29/81

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MAIN TEST AHR #50973
Opn# 800

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FAILURE REPORT

S 8205

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL1162		FLIGHT	1400	MO 12 DA 14 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM # 50988	PREAMP ASSY	50988	201	11323
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: DURING RECHECK OF SELECT RESISTORS AND CAPACITORS FOUND CH 3 BAND 5 TO HAVE OSCILLATIONS (NO DETECTORS IN OPS).

16. TEST PROCEDURE: 16192 | PARA: 4.10 | 18. ORIGINATOR: L.O. Anderson | ORG: 22-13 | DATE: 8 DEC 81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

16. VERIFICATION AND FAILURE ANALYSIS: Improper selection of C24. Reconstruction of amp components indicated. REMOVED COMPONENTS WERE WITHIN SELECT SPECIFICATION RANGE.

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: PLACE R7 and C24 on STANDOFFS FOR RESELECT. #7619

21. AUTHORIZATION: [signature] | ORG: 2121 | DATE: 12/14/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Removed and tested per supplement #2.

24. QA [signature]

25. TEST [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Improper selection of C24. There are small differences in capacitance between having the part on standoff during selection and after the part has been soldered to the board. Consequently the difference is enough to require reselection.

31. CONTINUATION ☐ SHEET USED

33. FRB CLOSURE [signature] 2/22/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	1/18/82	[signature]	22-41	2/22/82

39. RELIABILITY	ORG	DATE	CUSTOMER OR SUPPLIER	DATE
[signature]			[signature] 2/22/82	

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#SC973 TEST AHC eqn = 1860.

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FAILURE REPORT

S 8207

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TDN | 2. GLA: 1162 | 3. MODEL: F-1 | 4. TIME OBSERVED: 3:30 Am | 5. DATE OBSERVED: MO 2 DA 6 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY	C7PA	SC973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 92° F AXIS FOR MIN TYPE ☐ THERMAL VAC HRS AT ☐ OTHER

14. DESCRIPTION OF FAILURE: No output Band 7 CH 7

15. TEST PROCEDURE: 16192 | PARA 4.1.4 | 16. ORIGINATOR: N.C. Davison II | ORG 2213 | DATE 2-8-82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Problem determined to be an improperly mated coax cable connector. No evidence existed to suggest component. No OUT OF DESIGN ELECTRICAL POWER COULD HAVE BEEN APPLIED. UNIT IN NORMAL TEST CONFIGURATION.

19. FAILED ITEM NAME AND PART NUMBER: NONE

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: No components failed.

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Connector was properly mated and test was continued.

24. QA ACCEPT: J.B. 2/8

25. QA REJECT: 1 178

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Preamp board was not properly mounted in preamp housing. The board was not secured to the housing so the use of the connector to the PWB and its connector moved over when the coax cable connector was engaged. Personnel instructed on proper installation of PWBs in housing. A NOTICE WAS 2-23-82 ATTACHED TO THE ☒ CONTINUATION SHEET USED

31. FRB CLOSURE: ✓ 2/22/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: D.W. Mendell | ORG 2121 | DATE 2/11/82 | 38. SPACECRAFT SYSTEM ENGINEER: L.L. Engel | ORG 22-41 | DATE 2/22/82

39. RELIABILITY: G. Parlane | ORG 5141 | DATE 2-18-82 | 40. CUSTOMER OR SUPPLIER: E.F. 2-23-82 | DATE

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FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. S 8207

CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

30 SURFACE OF THE HOUSING USED FOR TESTING PURPOSES. THIS NOTICE READS "SCREWS ON EITHER SIDE OF CONNECTORS MUST BE IN PLACE TO INSURE PWB IS HELD FIRMLY TO ALLOW PROPER CONNECTOR MATING" OF

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FAILURE REPORT

S 8208

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M. (PL 1162)		FLT-1	VARIOUS	MO 2 DA 11 YR 1982

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CFPA IN DEWAR	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 92 K ☐ THERMAL VAC ____ AXIS FOR ____ MIN TYPE ____ HRS AT ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: SEE CONTINUATION SHEETS A AND B.

16. TEST PROCEDURE	PARA	18. ORIGINATOR	ORG	DATE	☐ CONTINUATION SHEET USED
16192	4.14, 4.15	N.C. DAVISON, III	2213	11, 1982	☒

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: UNIT WAS IN NORMAL TEST CONFIGURATION. NO OVERSTRESS OCCURRED. GA

18. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: Discrepancies are small and will not affect performance enough to warrant rework.

21. AUTHORIZATION: [signature] ORG 2121 DATE 2/5/82 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: NONE

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: The pulse response discrepancies are a function of the feedback resistor on the FPA substrate and its associated capacitance and the frequency dependent resistors on the detector. These discrepancies are small and will not affect performance enough to warrant rework. Approval to use as is per Waiver 135

☐ CONTINUATION SHEET USED

31. FAB CLOSURE: [signature] 2/22/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: Waiver W 135 (COPY ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	2/15/82	[signature]	22/61	2/22/82
39. RELIABILITY [signature]	ORG 51-41	DATE 2-18-82	40. CUSTOMER OR SUPPLIER		DATE

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2/22/82

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EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

S 8208 CONT. SHEET LETTER* A
FR SERIAL NO.

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON
– IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED

D. 310
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SENT 08

D 5 HAS THE FOLLOWING OUT OF SPEC. CONDITIONS:
16192 PARAGRAPH 4.14

ENT RESPONSE SPEC: ≤ 10% OVERSHOOT

.. 4	IS	:0.4%	CH. 10	IS	10.5%
CH. 6	IS	10.8%	CH. 11	IS	11.2%
CH. 7	IS	11.0%	CH. 12	IS	10.8%
CH. 9	IS	11.5%			

SETTLING TIME SPEC: SETTLED TO WITHIN 1.5% AFTER
2 2% + 30 μSec
SETTLED TO WITHIN 1.0% AFTE
2 2% + 60 μSec

CH. 10 IS + 2% AFTER 38 μSec
+ 1.5% AFTER 48 μSec
+ 1.0% AFTER 45 μSec

3 dB POINTS : SPEC: -2 TO -3 dB AT 52 KHZ

CH. 10 IS -3.19 dB AT 52 KHZ
CH. 12 IS -1.95 dB AT 52 KHZ

DELAY TIMES SPEC: DELAY TIMES SHALL BE WITHIN
± 0.5 μSec OF EACH OTHER

ALL CHANNELS AS A POPULATION DO NOT MEET THIS REQUIREMENT.

RISETIME (IN μSec)				FALL TIME (IN μSec)			
1	12.2	9	12.0	1	13.1	9	12.7
2	12.0	10	13.0	2	12.5	10	13.8
3	12.4	11	12.0	3	13.0	11	12.5
4	12.0	12	12.2	4	12.6	12	12.8
5	11.6	13	12.0	5	12.2	13	12.5
6	12.6	14	12.4	6	13.1	14	13.0
7	11.9	15	11.6	7	12.4	15	12.1
8	12.4	16	12.6	8	13.0	16	13.1

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EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

S 8208 CONT. SHEET LETTER* B
FR SERIAL NO. 1

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED.

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

14 BAND 7 HAS THE FOLLOWING OUT OF SPEC. CONDITIONS:
PER 16192 PARAGRAPH 4.14

TRANSIENT RESPONSE: SPEC: ≤ 10% OVERSHOOT

CH. 6 IS 11.0%

SETTLING TIMES SPEC: SETTLED TO WITHIN 1.5%
AFTER C.P. + 30 μSec
SETTLED TO WITHIN 1.0%
AFTER C.P. + 60 μSec

CH. 5 IS SETTLED TO 1.5% AFTER 33 μSec
CH. 5 " " " 1.0% AFTER 35 μSec

3 dB POINTS SPEC: -2 TO -3 dB AT 52 KHz

CH. 5 IS -3.25 dB AT 52 KHz
CH. 16 IS -3.32 dB AT 52 KHz

DELAY TIMES SPEC: DELAY TIMES SHALL BE WITHIN
± 0.5 μSec OF EACH OTHER

ALL CHANNELS AS A POPULATION DO NOT MEET THIS REQUIREMENT

RISETIME DELAY (IN μSec)				FALLTIME DELAY (IN μSec)			
1	12.0	9	12.9	1	12.3	9	13.4
2	12.1	10	12.5	2	12.5	10	13.2
3	11.8	11	12.4	3	12.2	11	12.9
4	12.5	12	12.3	4	12.8	12	12.7
5	12.0	13	12.2	5	12.6	13	12.6
6	12.3	14	12.4	6	12.6	14	12.8
7	12.2	15	12.3	7	12.5	15	12.8
8	12.6	16	13.0	8	13.0	16	13.4

FR 8208

REQUEST FOR DEVIATION/WAIVER
(MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-17-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [ ] MINOR [X] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F	11323	TM	W-135

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO
11323	50973	B	3895A, 2870A

9. TITLE OF DEVIATION/WAIVER: Permission to use F-1 CFPA with discrepancies per FR8208

10. CONTRACT NO. & LINE #: NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiometer

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: CFPA

16. PART NO. OR TYPE DESIG.: 50973

17. LOT NO.: 201

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [ ] NO

20. EFFECT ON COST/PRICE: > 50,000 if not approved

21. EFFECT ON DELIVERY SCHEDULE: 4 weeks if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.:

23. DESCRIPTION OF DEVIATION/WAIVER
Permission to use F-1 CFPA with discrepancies per FR 8208.
A copy of FR 8208 is attached -

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24. NEED FOR DEVIATION/WAIVER
To determine selects that would improve the pulse response would require removal of the optical filter assembly and retest. This is a risky operation and there is no guaranty that the results of reselection would give in specification performance. Discrepancies are small and will not affect performance enough to warrant rework.

REA DM Randall 2/17/82 SYS ENGR JL Casper PE

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
003

26. SUBMITTING ACTIVITY'S AUTHORIZING SIGNATURE: FR Rubiera TITLE: Program Manager.

27. APPROVAL/DISAPPROVAL

a. [X] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: LANDSAT-D PROJECT OFFICE

SIGNATURE: [illegible] DATE: 2/18/82

DD FORM 1694

SUPP #6 - OP #300

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FAILURE REPORT

S 8225

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
VOII TM		FLIGHT	3:30 P.M.	MO 8 DA 11 YR 1981

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	COLD FPA ASSY	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RR ☐ RADIATION ☐ VIBRATION ☒ TEMP 95 °K ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYP ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 5 CH. 9 INPUT SHORT TO GROUND, CH. 11 NO OUTPUT SIGNAL. BAND 7 CH. 2 NO OUTPUT SIGNAL. ALL ABOVE OBSERVED DURING INJECTED SIGNAL TEST.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
16192	4.6	A. C. DAVISON	2213	8/11/81	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress accurred. Inputs were derived from test equipment. Output is fed into very high impedence circuit, resulting in very low currents available to following circuitry. Unit was in normal test configuration.

19. FAILED ITEM NAME AND PART NUMBER: Cold Finger 50958

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace arrays per supplement #7

21. AUTHORIZED BY	ORG	DATE	22. CONTINUATION ☐ SHEET USED
[signature]	212	8/11/81	

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Both arrays were replaced per supplement #7. Band 5 detector failed open FR 8443. Band 7 detector failed, open FR 8340.

24. QA REVIEW (178)

25. QA APPROVED (178)

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
50955 Band 5		96-331A	11-116			
50958 Band 7		96-331A-13-128				

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: These arrays were damaged during assembly processing. This was discovered by the need to measure test detector elements would not input opens due to poor T.A.V. coverage of thick S.Ox step. The arrays were obtained during removal from FPA and no further failure analysis was possible.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: [signature] 2/22/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

38. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	39. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	212	2/10/82	[signature]	22-41	2/22/82

36. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	5141	2-18-82	[signature] 2-24-82	

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FAILURE REPORT

S 822

ORIGINATOR

1. PROGRAM NAME AND NUMBER: V011 TM
2. GLA:
3. MODEL: FLIGHT
4. TIME OBSERVED: 10:30 am
5. DATE OBSERVED: MO 09 DA 08 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CFPA Assy	50973	201	SBEC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RI ☐ RADIATION ☐ VIBRATION ☒ TEMP AMB °___ ☐ THERMAL VAC ___ HRS AT ___ °___ AXIS FOR ___ MSN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: Band 5, Ch. 10, 12 Difference Between Signal & Reference Offset Measured > ±10 mV. Ch. 10 Sig-Ref = 378 mV, Ch. 12 Sig-Ref = 362 mV. Drain Currents in Spec.

15. TEST PROCEDURE: 16192 | PARA: 4.2 | 16. ORIGINATOR: C. R. Lore | ORG: 2213 | DATE: 08-05-82 | 17. CONTIN ☐ SHEET

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress occurred. Unit was in normal test configuration. Outputs are fed into high impedance circuit, limiting current to other devices.

19. FAILED ITEM NAME AND PART NUMBER: Amplifier 50958

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Repair with Acc per MRCO 39323

21. AUTHORITY: [signature] | ORG: 2121 | DATE: 8/19/82 | 22. CONTIN ☐ SHEET

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Repaired with Acc parts per MRCO 39323. Ch 10 and Ch 12 offset voltages Ref. TR 839. Assy failed limits of TP 9443 pf Spurious Analysis

24. QA ☐

25. QA RE ☐

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS
50958 Band 5		9L-2216A	11-101			

27. REWORK BY: ___ ORG: ___ DATE: ___ | 28. RETESTED BY: ___ ORG: ___ DATE: ___ | 29. CONTI ☐ SHEET

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause is unknown. Possibility exists that transient was caused by Acc current due to ESD or other current source (possibly detected pull test) or electrical overstress (Ch 10 Sig step known to be a hard case & contributing)

31. FRB CLOSURE: ☐ CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 2121 | DATE: 2/10/82

38. SPACECRAFT SYSTEM ENGINEER: [signature] | ORG: 22-41 | DATE: 2/2

39. RELIABILITY: [signature] | ORG: 5941 | DATE: 2-19-82

40. CUSTOMER OR SUPPLIER: [signature] | DATE: 2/22/82

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50973 AHR - Supp. 7 - OPR 316

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FAILURE REPORT

S 8226

ORIGINATOR

1. PROGRAM NAME AND NUMBER: V011 TM
2. GLA:
3. MODEL: FLIGHT
4. TIME OBSERVED: 10:30 AM
5. DATE OBSERVED: MO 09 DA 08 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CFPA Assy	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP AMB ° ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Band 5, Ch. 10, 12 Difference between signal and reference offset measured > ± 10 mV. Ch. 10 Sig-Ref = 325 mV Ch. 12 Sig-Ref = 362 mV. Drain current: in spec.

18. TEST PROCEDURE: 16192 PARA 4.2 | 16. ORIGINATOR: C. R. Lane ORG 2213 DATE 08-05-81 | 17. CONTINUATION ☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress occurred. Unit was in normal test configuration. Offsets are fed into high impedance circuit, limiting current to other devices.

19. FAILED ITEM NAME AND PART NUMBER: Gate Detector 50458

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Repair with Ag epoxy per MRCO 393239

21. AUTHORITY: [signature] ORG 2121 DATE 8/9/81 | 22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Repaired with Ag epoxy per MRCO 393239 Removed damaged substrate, Ref. TR 2319. Arrays failed Lot Acc. ref. TR 2443 for failure analysis

24. QA REWORK: [signature] 8/17

25. QA RETEST: [signature] 8/20

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
50458 Bands		96-331KF	11-101			

27. REWORK BY: ORG DATE | 28. RETESTED BY: ORG DATE | 29. ☒ CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Cause is unknown. Possibilities are: Detector trace was opened by large current due to ESD or other current source (possibly defective pull tester) or a defect inherent in the detector. Check SIO of step. Reason to be a hard area. To continue F&A

31. CONTINUATION ☐ SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION:

33. FRB CLOSURE: [signature] 2/22/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	2/10/82	[signature]	22-41	2/22/82
39. RELIABILITY [signature]	ORG 3941	DATE 2-18-82	40. CUSTOMER OR SUPPLIER		DATE

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2/22/82

Oper 300 MRCO 393239R / Suppl. 7 oper. # 316

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FAILURE REPORT

S 8319

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V011 TM		FLIGHT	11 am	MO 09 DA 19 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	CFPA	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 95 °K ☐ THERMAL VAC ____ HRS AT ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH. 10 EXHIBITS NO RESPONSE TO INJECTED SIGNAL
CH. 12 RESPONSE TO INJECTED SIGNAL TOO HIGH 455 mv
Bonds

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16192	4.6	C R Lane	2213	09-19-81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No quiescent current measured. Unit was in normal test configuration. Output is fed through high impedance circuit limiting current to other devices.

19. FAILED ITEM NAME AND PART NUMBER: Gold Bonds 5095A

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED (CAUSE): Waiver 109 allowed use of this PCA with CH 10 inoperable. Board to be repaired with eg. epoxy.

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
[signature]	2121	11/9/81	☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: This action found per Ref FR 8443. Channel 12 was requalified per spec and tested good. Refer to FR 8443 for failure analysis.

24. QA INSPECTOR: [signature]

25. QA INSPECTOR: [signature]

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM
5095A Bonds		796-3316A-11-101				

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CH 10 was probably damaged during rework of open per MRCO 393293. Ref FR 8226
CH 12 was open due to inadequate epoxy repair.

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31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: [signature] 2/22/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE — 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	2/17/82	[signature]	22-41	2/22/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	5141	2-18-82	[signature]	

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2/22/82

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* 50973 TEST AHR, BREADBOARD 200

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FAILURE REPORT

S 8340

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
V411 TM		FLIGHT	5: PM	MO 10 DA 22 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	CFPA	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD	Test AHR			
11. OTHER	BAND 7			

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ☑ TEMP 71 °C ☐ THERMAL VAC ____ HRS AT ____ °C ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 7, CH 8 and 16 unable to set bias adjust per 16192 para 4.10. CH 8 read ≈ 4 volts, CH 16 read ≈ 8.9 volts. Both should be ≈ 5 volts

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16192	4.10	[signature]	2213	22 OCT 81	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress analysis. Bruce was informed that configuration is 8.9 V appeared at Pin 6 of A HA 3204. This point can withstand a differential input of ±18.0 volts. Voltage was seen on Temp Board.

19. FAILED ITEM NAME AND PART NUMBER: 50458 Quad Inverter

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Replace Bit per supplement #8

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
[signature]	2121	10/22/81	☐

MANUFACTURING AND TEST

22. REWORK/RETEST ACTION TAKEN: Bit replaced per supplement #8. Bit tested satisfactorily per TP 84993

23. QA REWORK [signature]

24. QA RETEST [signature]

25. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
50458 Band 7		986-3316A-13-162				

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Unknown. Best possibility is that incorrect pulltabs were at fault. The pulltabs were later found to be defective and Rad Hard on the pullboard. The detector was sent to TSD for failure analysis and results were negative. Ref TSD report 76-1F-42

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE [signature] 2/22/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☒ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☒ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	2/10/82	[signature]	22-41	2/22/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	2-18-82	[signature]	

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2/22/82

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FAILURE REPORT

S 8394

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER PL1162		F1	11:00 AM	MO 2 DA 26 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY		50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROCESS ☐ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Electrical shorts between FPW cables and radiative cooler structure observed during trial fit of CFDA IR cooler.

15. TEST PROCEDURE | PARA | 16. ORIGINATOR D. Taylor | ORG 22-31 | DATE 2-26-82 | 17. CONTINUATION SHEET USED ☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: Brightness check using ohmmeter did not stress any electrical components.

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Rework per SO 4173 and test for electrical isolation.

21. AUTHORIZATION J.M. Randall | ORG 2121 | DATE 2-26-82 | 22. CONTINUATION SHEET USED ☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Reworked to SO 4173 and electrical isolation tested good.

24. REWORK 178

25. RETEST 178

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUM

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. CONTINUATION SHEET USED ☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Tolerance buildup between FPW cable shields and cooler caused short circuit between shield and cooler structure. SO 4173 installed insulating tape between cable shields and cooler structure.

(COPY ATTACHED)

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4173 A EFFECTIVITY S/N 003 ONLY

33. FRB CLOSURE: 3/8/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: J.M. Randall | ORG 2121 | DATE 3/5/82

38. SPACECRAFT/STEM ENGINEER: [signature] | ORG 2241 | DATE 3/8/82

39. RELIABILITY: [signature] | ORG 5141 | DATE 3-5-82

40. CUSTOMER OR SUPPLIER: [signature] | DATE 3/10/82

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AHR SUPP #J-50973
CP #245

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FAILURE REPORT

S 8438

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM V011 PL 1162		FLIGHT	3:30 P.M.	MO 6 DA 24 YR 81

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	COLD FPA ASSY	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 91.5 °K ☐ THERMAL VAC ____ HRS AT ____ ° AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 5: CH.'S 10 & 12 EXHIBIT EXCESSIVELY HIGH OUTPUT DURING INJECTED SIGNAL TEST, INDICATIVE OF DETACHED DETECTOR ELEMENTS.

ENGINEERING EVALUATION

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
16192	4.6	N. G. DAVISON	2213	6-26-81	☐

18. VERIFICATION AND FAILURE ANALYSIS: Epoxy was accidentally dropped on the Band 5 detector while mounting the Band 5 filter, on the FPA. The TIR traces were damaged during cleanup of the epoxy; resulting in open traces. No other components were functionally affected.

☒ FAILED ITEM NAME AND PART NUMBER

19. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Repair and test per MRCO 393216R

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
J. Kendall	2122		☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Repaired and tested good per MRCO 393216R

24. QA [signature] 25. QA [signature]

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Epoxy was accidentally dropped on the Band 5 detector while mounting the Band 5 filter on the FPA. The TIR traces were damaged during cleanup of the epoxy resulting in open traces. The open traces were repaired using conductive epoxy per MRCO 393216R. Glaser w/o 82-R1 authorized repair.

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

33. FRB CLOSURE: [signature] 8/6/81

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☒ ASSY/FAB ERROR ☒ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
J. Kendall	2122	8/5/81	[signature]	2261	8/8/81

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
C. Perkins	514	8-5-81	[signature] 8/6/81	

011873 SC JAN 80

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S8438

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

1. ORIGINATOR NAME AND ADDRESS: David M. Randall
SBRC, 75 Coromar Dr. Goleta, Ca. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS DESIG.	d. NUMBERED NO
P	11323		

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [ ] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	REV
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MFR. NO.
11323	50973	B	2870A

9. TITLE OF DEVIATION/WAIVER
Conductive Epoxy Repair of InSb Detector Traces

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer

CLASSIFICATION OF EFFECT

12. ED NO.: EE

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Cold Focal Plane Assy

16. PART NO. OR TYPE DESIG.: 50973

17. LOT NO.: 201

18. QTY: 1

19. INTERCHANGEABLE: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
$30,000 - Minimum

21. EFFECT ON DELIVERY SCHEDULE
3 weeks minimum

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

2216 Epoxy was accidentally dropped onto the Band 5 detector while mounting the Band 7 detector and subsequent cleaning caused open traces on Channels 10 & 12. Silver epoxy was successfully used to repair these channels. Since it is impossible to determine if any damage was incurred on other channels during the cleaning operation that may result in open traces in the future, this waiver requests permission to use silver epoxy to ensure the continuity of all the Band 5 detector traces.

This repair is ideal for InSb detectors since the junction impedance is high (80 megoh any series impedance caused by use of silver epoxy is easily tolerated. Series impedan of 10K ohms would not have any effect on performance and impedances using silver epoxy will be less than 10 ohms. See attachment A for schematic.

24. REASON FOR DEVIATION/WAIVER *(Conductive epoxy will be applied to Band 7 detector traces also to further assurance that continuity will be maintained across thick SiOx.)
The FPA has had several detector changes and the risk of losing the entire FPA by changing this detector is approximately 50%. If the FPA were lost the cost to the program would be in excess of $500,000.00 and the delivery schedule would be set back 6 months.*

REA D.M. Randall SYS ENGR L.L. Cooper RE L. Parlee 7-6-8, QA [illegible] PE [illegible] 7-7

25. PRODUCTION EFFECTIVITY OR SERIAL NUMBER
003

26. SIGNATURE & SECURITY AUTHORIZING SIGNATURE
V.K. Enright 610709

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

[X] APPROVAL RECOMMENDED

[X] APPROVED [ ] DISAPPROVED

28. GOVERNMENT ACTIVITY
LANDSAT-D INSTRUMENT MGR

SIGNATURE [illegible] DATE 7/24/81

DD FORM 1694

Supp #8 open 2/5/82 NCMR 36075 & MRCO SA #620

HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

ORIGINAL PAGE IS OF POOR QUALITY

S 8443

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
Y011 T.M.		FLIGHT	9:00 P.M.	MO Nov, DA 25, YR 1981

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	CFPA	50973	201	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☒ TEMP 92 °F ☐ THERMAL VAC ____ HRS AT ____ °F ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: BAND 5 CH. 12 10HZ RESPONSE IS 19.4 mV ⇒ OPEN DET.
BAND 7 CH. 2, 4, 6, RESPONSE IS 19.4 mV ⇒ OPEN DETECTORS
" " CH. 1, 5, 8 NO RESPONSE ⇒ SHORTED DETECTORS

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION
16192	4.6	A.C. DAWSON, III	2213	11/24/81	☐ SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No overstress acquired. Unit was in normal test configuration. Outputs are fed into very high impedance circuit that limits current to following circuitry.

18. FAILED ITEM NAME AND PART NUMBER: Det. Assy. 50958

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Rework to replace arrays per supplement #10

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION
[signature]	212	11/24/81	☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Arrays replaced per supplement #10. Band 5 tested good. Band 7 failed. Ref. TR 8230.

24. QA REWORK: [signature] 1/22/82

25. QA RETEST: [signature] 1/22/82

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
Band 5 50958		906-3316A	11-101			
Band 7 50958		906-3316A	13-2			

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION
						☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Band 5 Ch 12 was due to a failure of Hg epoxy rework done per MRCO 393239. Ref TR 8226.
Band 7 failure was confirmed to be due to discharge of electric current. Ch 2, 4 & 6 had TiAu traces blown open. The wire bond pull test was found to be defective and allowing 4V to be applied to detectors. Pull tester was updated.

31. FRB CLOSURE: [signature] 2/22/82

31. ☒ CONTINUATION SHEET USED

32. ☒ DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☒ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	2121	2/10/82	[signature]	22-41	2/22/82

39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER	DATE
[signature]	51-41	3-18-82		

D11873 SC JAN 80

2/15/82

HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. S8443

CONTINUATION SHEET LETTER* A

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

30 SEM PHOTOS SHOW CH 2, 4 & 6 HAVE OPENS. THESE OPENS HAVE A METAL SPLATTER ADJACENT TO THE SPACE, INDICATING AN OVERHEATING (PROBABLY DUE TO OVERVOLTAGE) AND FLOW OF THE DISPLACED METAL FROM THE CONDUCTIVE TRACE. IT IS ASSUMED THAT CHANNELS 1, 5, & 8 WERE SHORTED BY THE SAME MECHANISM, BUT THAT THE DURATION OF THE APPLIED POWER, OR ITS AMPLITUDE WERE NOT SUFFICIENT TO CAUSE AN OPEN IN THE LEADS. BANDS 5 & 7 DETECTORS HAVE BEEN FORWARDED TO GSFC FOR THEIR USE.

SECTION 2.7
RADIATIVE COOLER

Section 2.7.1

Radiative Cooler

Performance Data

Radiative cooler performance data is included in Appendix F (Vol. IV, Part F)

2.7.2
Acceptance Data

2.7.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

P/N 51200 S/N 003
COOLER ASSY, RADIATIVE (A3A1)

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	51200	COOLER ASSY, RADIATIVE (A3A1)	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	003
4	16174	INSP, CLEANING, & HAND RAD COOLER COMPONENTS & SUB ASSY - REQ. FOR	A	A	A	
4	16181	INSULATION, ALUMINIZED MYLAR APPLICATION OF	A	A	A	
4	16183	BONDING, THERMALLY CONDUCTIVE, RAD COOLER, PROCESS	A *(N)7522	A	A	
4	16188	THERMAL VACUUM ACCEPTANCE TEST-RAD COOLER PROCEDURE	B	B	B	
4	16189	WORKMANSHIP VIBRATION	A 4152A	A 4152A	A 4152A	
4	16469	CRIMPING 922426 CONTACTS	A	A	A	

*N = Non-Mandatory

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
4	50973	CFP/COOLER CABLE	B 2870A 3895A 4173A SB-D004 W102-R1 W109 W111 W134 W135	B 2870A 3895A 4173A SB-D004 W102-R1 W109 W111 W134 W135	B 2870A 3895A 4173A SB-D004 W102-R1 W109 W111 W134 W135	201
4	51167	COVER ASSY-COLD STAGE	A	A	A	301
4	51168	COVER ASSY, AMBIENT	A	A	A	301
4	51169	HOUSING ASSY, COLD STAGE	C 3921A 3926A	C 3921A 3926A	C 3921A 3926A	301
4	51208	COVER ASSY, INTERM STAGE	A	A	A	301
4	51210	DISC BARRIER	B	B	B	
4	51211	CLAMP, BARRIER DISC	C	C	C	
4	51310	STRUCTURE ASSY	B 2904A 3970A	B 2904A 3970A	B 2904A 3970A	301
4	51486	PLATE, APERTURE	D	D	D	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
4	51488-1	STRIP, COVER	B	B	B	
4	51488-2	STRIP, COVER	B	B	B	
4	51491	WASHER, FLAT	A	A	A	
4	52709	BLK ASSY, THERMISTOR	B	B	B	301 & 302
4	52711	BLK ASSY, THERMISTOR	B	B	B	301 & 302

W. D. Adams 4-26-82
W. D. Adams, Quality

R. A. Groves 4/26/82
R. A. Groves, CDMO

Listing of Liens

RADIATIVE COOLER

P/N 51200

FLIGHT

Failure Reports Number	
Open	Closed
	S3106
	S8117
	S8118
S8136	S8124
	S8180
	S8370

Deviation	Waivers
	W-144
	W-147
	W-149
	W-151

RADIATIVE COOLER

P/N 51200

FLIGHT		PROTOFLIGHT		ENGINEER	
Failure Report No.		Failure Report No.		Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
S8136	S8106		F2670		F0531
	S8117		F2689		F0523
	S8118		F2704		
	S8124		F5186		
	S8180				
	S8370				

V. 144

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: 23 March 1982

PROCURING ACTIVITY NO.: 8

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight	11323	TM	W-144

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM	11323	16192	Rev. E
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.

9. TITLE OF DEVIATION/WAIVER
Deviation from radiative cooler test plan

10. CONTRACT NO. & LINE ITEM
NAS-5 2400

11. CONFIGURATION ITEM NOMENCLATURE
Radiative cooler

12. CI NO. | 13. ASPECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. REQUIRING DEVIATION/WAIVER
Radiative cooler	51200-E	N/A	1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
none

21. EFFECT ON DELIVERY SCHEDULE
2 days

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
none

23. DESCRIPTION OF DEVIATION/WAIVER

The following deletions from the Rad Cooler bench test cooler tests following integration of the CTPA were made

1. Band 6 ohmic check per 16192 para. 4.5.
2. Band 6 blackbody acceptance tests per 16192 para. 4.17. Quartz halogen source used instead of blackbody.
3. Verification of CTPA/Rad Cooler thermal conductance per 16191 para 3.4.5 g thru m.

All the above tests will be conducted following vibration testing of the Rad Cooler per AHR without change.

24. NEED FOR DEVIATION/WAIVER

1, 2 Erroneous interpretation of E.O. 4152A.
3. Unnecessary duplication of test data.

PE [signature] 3/23/82
QA [signature] 3-23-82
REA D. Hunter SYS ENGR [signature] PE [signature] 3-22-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
SIC65 SN 003 ONLY

CMO [signature]

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature] 3/23/82 TITLE: Minor - System Engineering; Major/Critical - Program Manager

27. APPROVAL, DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: George B. Fitts DATE: 3/24/82

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE VEL-STD-440 OR 401 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 0

1. ORIGINATOR (NAME AND ADDRESS)
SANTA BARBARA RESEARCH CENTER
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight 1	11323	TM	W147

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM	11323	16188	Rev B
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.

9. TITLE OF DEVIATION/WAIVER
Deviation from radiative cooler test plan

10. CONTRACT NO. & LINE ITEM
NAS-S 24200

11. NOMENCLATURE
Radiative Cooler

12. CAGE NO. | 13. ASPECT NO. | 14. ASPECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Radiative Cooler

16. PART NO. OR TYPE DESIG.: 51200-E

17. LOT NO.: N/A

18. QTY: 1

19. REQUIRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Reduce test effort by one day.

21. EFFECT ON DELIVERY SCHEDULE
1 day

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Shorten thermal-vacuum chamber/space background simulator pre-test 60°C bakeout from 72 hours to 40 hours. (16188 para 4.2.4)

24. NEED FOR DEVIATION/WAIVER
To reduce cost - high vacuum (3×10^{-6} Torr) achieved after 40 hour bakeout.

REA D. Hughes SYS ENGR [signature] PE [signature] 3/26/82
QA [signature] 3/26/82 DIV [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 ONLY

CMO [signature]

26. INITIATING ACTIVITY / INITIATING SIGNATURE
[signature] 3/26/82

TITLE
Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL, DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY
NASA GSFC

SIGNATURE
[signature]

DATE
3/29/82

DD FORM SEP 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR MIL FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO. 14

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. ☐ DEVIATION ☒ WAIVER

3. ☐ MINOR ☒ MAJOR ☐ CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. ACTIV. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight 1	11323	TM	W149

5. BASE LINE AFFECTED: ☒ FUNC. TIONAL ☐ ALLO. CATED ☐ PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: ☐ YES ☒ NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	ACTIV. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

ACTIV. CODE	NUMBER	DEV.	ADD. NO.
	51200	E	

9. TITLE OF DEVIATION/WAIVER
Waiver from radiative cooler circuit diagram.

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Radiative Cooler

CLASSIFICATION OF DEFECT

12. CD NO. | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: ☐ MINOR ☒ MAJOR ☐ CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. REQUIRING DEVIATION/WAIVER
Radiative Cooler	51200-E	N/A	1	☐ YES ☒ NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
None if implemented

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Use as-is the following circuit discrepancy:
Cooler intermediate stage platinum resistance temp sensor circuit at connector W3P4 pin 13 to pin 14 shows open, resulting in the loss of one lead in a redundant two-lead sensor hookup. P/N 51394 has a crack in the solder pad where it joins the trace lead. Will incorporate EO 4269A (spot bonding) to prevent propagation of crack. Redundant lead has adequate pad-to-solder connection to insure a reliable circuit.

24. NEED FOR DEVIATION/WAIVER
Risk of repair or replacement not warranted - redundant lead maintains circuit operational.

RE [signature]
QA [signature]
REA [signature] SYS ENGR [signature] for J Ford 4/16/82 PE [signature] 4-16-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
5106 SN 003 ONLY

[signature] for R Phillips CMO 4-9-82

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE
[signature] J Ford 4/16/82

TITLE Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. ☑ APPROVAL RECOMMENDED

b. ☑ APPROVED ☐ DISAPPROVED

c. GOVERNMENT ACTIVITY
LANDSAT-D PROJECT

SIGNATURE [signature] DATE 4/16/82

DD FORM 1694

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REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 4/9/82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS: Terry Cafferty
SBRC, 75 Coromar Dr., Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
b	11323	TPM	W-151

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN	11323	16188	REV B

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.

9. TITLE OF DEVIATION/WAIVER: Permission to shorten temperature control tests

10. CONTRACT NO. & LINE ITEM: NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE: Radiative Cooler

CLASSIFICATION OF DEFECT

12. CD NO.: NA

13. DEFECT NO.: NA

14. DEFECT CLASSIFICATION: [ ] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Radiative Cooler

16. PART NO. OR TYPE DESIG.: 51200-E

17. LOT NO.: NA

18. QTY: 1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE: $1500 if not approved

21. EFFECT ON DELIVERY SCHEDULE: 8 Hours

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.: None

23. DESCRIPTION OF DEVIATION/WAIVER

Long term stability tests are specified for the primary CTPA temperature control system at 90, 95, and 105K. The requirement is ±0.1K over an 8 hour period at each setpoint. No temperature change is discernible in the control diode voltage readings at 95K, and only 0.04K change is observed for the 105K setpoint. It is requested that the 8-hour requirement be shortened to 4 hours. It is also requested that the outgas control test be shortened from 24 hours to the minimum time necessary to demonstrate outgas system functionality.

24. NEED FOR DEVIATION/WAIVER

This waiver would provide schedule relief which could be of value in troubleshooting noise and offset anomalies observed in several channels of Bards 5 and 7 during thermal/vacuum testing of the radiative cooler.

RE [signature] 4-19-82
QA [signature]
PE [signature]
REA W. Baliuski SYS ENGR J.L. Engel
CVO [signature] 4-19-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER: 51065 SERNO 003 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J.L. Engel 4/12/82 TITLE

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA SSE

SIGNATURE: [signature] DATE

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EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

S 8118

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM PL1162		FLIGHT	9:00 AM	MO 4 DA 27 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT		51200	002	SBRC
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD		50942	003	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ☒ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Cold Stage outgas temperature controller unable to achieve 20°C setpoint temp. while radiating to simulated space background.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION ☐ SHEET USED
STR F010 16188		D Lee	22 31	4/27/82	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: No failure - PRT temp. control sensor achieved 20°C set point, but CFPA diode was steady- state at -3 °C, due to steady-state thermal gradient in cold stage structure, as verified by analysis.

19. FAILED ITEM NAME AND PART NUMBER: None

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☒ REWORK/RETEST NOT REQUIRED BECAUSE: No failure, normal operation.

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION ☐ SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMB

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION ☐ SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Test Engineer believed temp. gradient should be less than measured, however analysis shows temp. gradient to be real. (Refer to Continuation Sheet)

31. CONTINUATION ☐ SHEET USED

33. FRB CLOSURE: 5/6/82

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
D Lee	22-31	4-29-82		22-41	5/5/82
39. RELIABILITY: D Leslie	51-41	4-30-82	40. CUSTOMER OR SUPPLIER		DATE

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5/11/82

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FAILURE REPORT
CONTINUATION SHEET

FR SERIAL NO. S8118

CONTINUATION SHEET NO. [illegible]

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

30 A thermal analysis of the Cold Stage Heater and the Cold Stage Radiator was performed. The results are as follows:

1. Heater and Seusor show the following heating dynamics: (Temp. vs. Time)

Time zero - Temperature of Cold Stage was ~~[illegible]~~ -156.2 °C. (start)

5700 seconds later - Temperature of Cold Stage was -20.3°C.

2. Cold Stage Radiator shows the following heating dynamics: (Temp. vs. time)

Time zero - Temperature of Cold Stage Radiator was - 156.5°C

8700 seconds later - Temperature of Cold Stage Radiator was -4.9°C

Note: Cold Focal Plane is Heat-Sink to the Cold Stage Radiator and is essentially the same temperature as the radiator.

D Kaufman

D11873A JAN 80

SECTION 2.8
RADIATIVE COOLER DOOR ASSEMBLY

2.8.1 Radiative Cooler Door Assembly

2.8.1.1
No performance data was taken at the subsystem level on this subsystem.

2.3.2
Acceptance Data

2.8.2.1
Configuration Lists

Configuration listing for the Radiative Cooler Door is included in Section 2.7, Radiative Cooler

Listing of Liens

RADIATIVE COOLER DOOR ASSEMBLY

P/N 51740

FLIGHT

Failure Reports Number	
Open	Closed
	-
	S8143
	S8145
S8149	S8150

Deviation	Waivers
	W-150

RADIATIVE COOLER DOOR ASSY.

P/N 51740

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
	S8143		F1741		F0507
S8149	S8145		F2694		F0512
	S8150		F2766		F0517
			F5177		F0518
					F0523
					F0528
					F0594
					F2753
					S8098

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FAILURE REPORT

S 8145

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
TM 1162		FLIGHT 003	3 PM	MO 6 DA 9 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☒ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☒ SUBASSEMBLY	DOOR ASSY, LOWER	51740	003	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ___ ☐ THERMAL VAC ___ HRS AT ___ AXIS FOR ___ MIN TYPE ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: OUTGAS POSITION CANNOT BE ADJUSTED TO MEET PARA 3.2.4.4 SPEC 1B912 REV C.

15. TEST PROCEDURE: P912 | PARA 3.2.4.4 | 16. ORIGINATOR: D. DASCOMB | ORG | DATE 6/9/82 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS

19. FAILED ITEM NAME AND PART NUMBER

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: See Dwg. ~~5[illegible]~~ 5[illegible] Sht 2, Zone 4D/E. Reduce switch override time duration at U13-5 from "1.5 SEC" to "APPROX 0.7 SEC" (actually comes out 0.65 SEC). See EO 4457A. Now door doesn't open too far past outgas spec'd position.

21. AUTHORIZATION: Current | ORG 22-17 | DATE 6/11/82 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Changed R58 from 1.2 M to 470K

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
90866I-137					N/A	

27. REWORK BY: [signature] | ORG 22-73 | DATE 6/15/82 | 28. RETESTED BY: [signature] | ORG 22 13 | DATE 6/17/82 | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: DURATION OF SIGNAL TO OPEN DOOR TO OUT GAS POSITION WAS TOO LONG.
EO 4457 A ~~to~~ CHANGES RESISTOR VALUE IN TIMING CIRCUIT TO MATCH MOTOR SPEED AND GEARING/BACKLASH CHARACTERISTICS.
→ COPY ATTACHED

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4457 A EFFECTIVITY S/N 003 & SUBS.

33. FRB CLOSURE: [signature] 6/17/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
[signature]	22-17	6/17/82	[signature] for Eng	SBRC	6/17/82
39. RELIABILITY: [signature]	ORG 51 41	DATE 6-17-82	40. CUSTOMER OR SUPPLIER: G.G.		DATE 7/6/82

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SBRC
CODE IDENT 11323

ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 445

SHEET 1 OF 1

DRAWING TITLE: ELECTRONIC DIAGRAM, MOTOR DRIVE, COOLER DOOR (A9)	DRAWING NUMBER: 50933 (D)
PROJECT NUMBER: PL 1162	ITEM DISPOSITION: REWORK ☐ ITEMS CONFORM ☐ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☒
CLASS CHANGE: I ☐ II ☒ A	DRAWING TYPE: A ☐ B ☒
EFFECTIVITY: 5106S JERND-003 & SUBQ	AUTHORIZING ECR NUMBER: TM 2737/02

DESCRIPTION OF CHANGE

1) ON F/D, SH 2, ZONE 4E
CHANGED VALUE R58
IS: 470K WAS: 1.2 M

2) CHANGED SWITCH OVERRIDE
IS: APPROX .5 SEC WAS: 1.5 SEC

"*" NOTE AND/OR ITEM NUMBER TO BE ASSIGNED STATUS OF INCORPORATION.

PREPARED BY: J PRINCE	DATE: 82-6-10	QUALITY APPROVAL: NO	DATE: 6-11-82	RELEASED BY:	DATE: 82-6
CHECKED BY:	DATE:	MANUFACTURING APPROVAL: DO	DATE: DO NOT USE THIS PRINT	INCORPORATED BY:	DATE:
REA/RSA APPROVAL	DATE: 6/11/82	PROJECT APPROVAL	DATE:	DRAWING REVISION LEVEL SHOWN: DRAWING REVISION LETTER	

T Simmons 6/11/82

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FAILURE REPORT

S 8150

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
THEMATIC MAPPER HS23A		E1	1100	MO 7 DA 1 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☑ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UUT				
9. ☑ ASSEMBLY ☐ SUBASSEMBLY	RC DOOR ASSY	S1740-1	003	
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☑ LAUNCH OPERATIONS — ✓ STR FO14

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ EMC/RFI ☐ RADIATION ☑ VIBRATION X AXIS FOR ___ MIN TYPE RANDOM ☐ THERMAL VAC ___ HRS AT ___ ☐ OTHER

14. DESCRIPTION OF FAILURE: ITEM 63, SHC SCREW, WAS NOTICABLY LOOSE AFTER X-AXIS VIBRATION, 2 PL. THESE SCREWS FASTEN THE ELECTROMAGNET BRACKETS TO THE DOOR ASSY. THERE ARE ALSO 4 OTHER FASTENERS FOR THESE BRACKETS

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUATION SHEET USED
STR FO14	2000	FINCHER	2235	1 JUL 82	☐

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: THESE SCREWS AND 1 OTHER WERE FOUND TO BE LOOSE. THIS WAS PROBABLY DUE TO INSUFFICIENT TORQUE BEFORE VIBRATION, OR AN INEFFECTIVE LOCKING DEVICE ON THE SCREWS

19. FAILED ITEM NAME AND PART NUMBER:

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: CONTINUE VIBRATION TEST TO COMPLETION. TEST DOOR PER SUPP 9 OF AHR S1740 (10 CYCLES). RETORQUE ALL FASTENERS ON ASSY AND NOTE LOOSE ITEMS. SPOT BOND HEADS TO PREVENT ROTATION

21. AUTHORIZATION	ORG	DATE	22. CONTINUATION SHEET USED
W. Cabanba			☐

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: STR FO14 COMPLETED. AHR S1740 SUPP 9 COMPLETED. FASTENERS RETORQUED AND SPOTBANDED. SEE E.O. 4529A. THIS EO ADA SPOTBOND TO PREVENT LOOSENING.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER
ITEM 63 SC80016-159						
ITEM 73 MS15795-803						

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUATION SHEET USED
						☐

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSED BY INEFFECTIVE LOCKING OF SCREWS. CORRECTED BY SPOTBONDING SCREWS AFTER TORQUING TO PREVENT LOOSENING. WASHER WERE CHANGED FROM SMALL PATTERN TO LARGE PATTERN TO INCREASE RIGIDITY.

COPY ATTACHED

31. CONTINUATION SHEET USED ☐

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4529A-EFFECTIVITY S/N 003 & SUBSQ

33. FRB CLOSURE: 7/20/82

34. BASIC CAUSE OF VERIFIED FAILURE: ☑ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☑ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT/SYSTEM ENGINEER	ORG	DATE
W. Cabanba	2235	7-13-82	[signature]	5-41	7/20/82
39. RELIABILITY [signature]	ORG 5141	DATE 7-13-82	40. CUSTOMER OR SUPPLIER [signature]		DATE 7/20/82

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SBRC ENGINEERING CHANGE REQUEST

SHEET 1 OF 1

NO. TM2749/01

DRAWING TITLE	DRAWING NUMBER	REV
RADIATIVE COOLER DOOR ASSY	51740	E

CLASS CHANGE	DRAWING TYPE	PRIORITY OF CHANGE	PROJECT NUMBER
I / II A	A / B	emergency / urgent / routine	1162

OTHER AFFECTED ENGINEERING DOCUMENTS

NONE

REASON CHANGE NEEDED (EXPLAIN IN FULL)

A FEW SCREWS LOOSENED DURING VIBRATION BUT DID NOT AFFECT THE DOOR FUNCTION OR PERFORMANCE. THIS CHANGE INSTALLS OVERSIZE WASHERS AND SPOT BONDS SCREWS TO PREVENT FUTURE PROBLEMS.

NATURE OF PROBLEM AND/OR REQUIRED CHANGE

SEE ED. 4528A

LEL for FR Phillips 7-9-82

REQUESTED BY	DATE	APPROVAL	DATE
FINCHER	7JUL82	[signature]	7/8/82
CMO REVIEWER	DATE	APPROVAL	DATE
[signature]	7-9-82	[signature]	7/9/82
EFFECTIVITY ~~SN005~~ SN003 & SUBSQ		APPROVAL [signature]	DATE 7/8/82
ITEM DISPOSITION		APPROVAL [signature]	DATE 7/8/82
REWORK ☐ ITEMS CONFORM ☐		APPROVAL [signature]	DATE 7/8/82
NO ITEMS MADE ☒ REJECT ☐		APPROVAL [signature]	DATE 7/8/82
USE ☐ NOT APPLICABLE ☐			

VELLUM ISSUE APPROVED BY

ACTION TAKEN

E.O. 4528A DWG. REV. ___

INCORP BY	DATE	HRS REQ
MC Finicle	7 JUL 82	—
CHECKED BY	DATE	HRS REQ
[signature]	8 JUL 82	—

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SBRC ENGINEERING ORDER ~~REVISION NOTICE~~ NO. 4528A

CODE IDENT 11323

SHEET 1 OF 11

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740-E

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
1162	REWORK ☐ ITEMS CONFORM ☐	I ☐ II ☒ A	A ☐ B ☐
EFFECTIVITY 51065 SN003 18 SUBSQ	NO ITEMS MADE ☒ REJECT ☐ USE ☐ NOT APPLICABLE ☐	AUTHORIZING ECB NUMBER TM2749/01	

DESCRIPTION OF CHANGE

1) LM, ADDED ITEM *1

6	—		MS15795-804	WASHER, FLAT (.125 NOM I.D.)	*1

2) LM, QTY REQD

ITEM 73 IS: 17 62 (-1 BSC) WAS: 23 62 (-1 BSC)

3) ADDED NOTE *2

*2 AFTER FINAL ADJUSTMENT, SPOT BOND INDICATED THREADED ITEM TO PREVENT ROTATION PER SP 80060-I-A-2.

* NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION.

PREPARED BY FINCHER	DATE 7JUL82	QUALITY APPROVAL	DATE 7/8/82	RELEASED BY	DATE
CHECKED BY	DATE 8 JUL 82	MANUFACTURING APPROVAL	DATE 7/8/82	INCORPORATED BY	DATE
REA/RSA APPROVAL	DATE 8 JUL 82	PROJECT APPROVAL	DATE 7/8/82	DRAWING REV LETTER	—

SB150

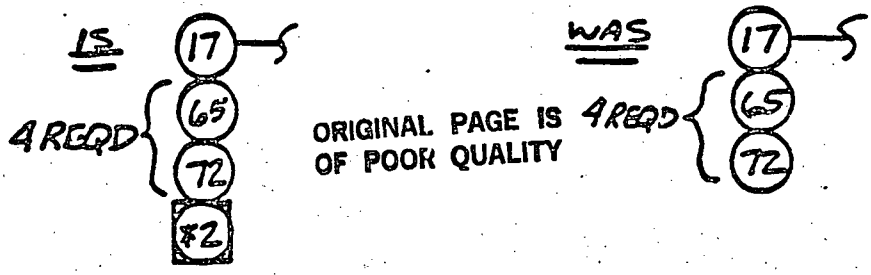
SBRC ENGINEERING ORDER ~~REVISION NOTICE~~ NO. 452

CODE IDENT NO. 18323 SHEET 2

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

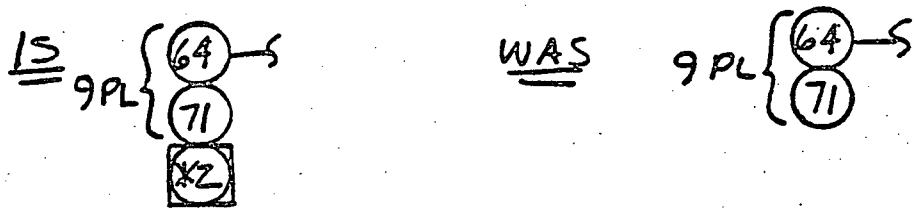
DESCRIPTION OF CHANGE

4) SH 2, ZN D7, ADDED CALLOUT

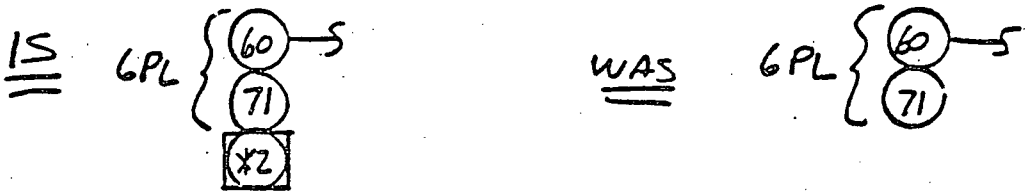


5) SH 2, ZN D7, ADDED CALLOUT

6) SH 2, ZN B7, ADDED CALLOUT



7) SH 2, ZN B7, ADDED CALLOUT



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SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528A

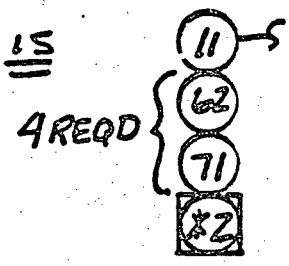
CODE IDENT 11023 SHEET 3

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

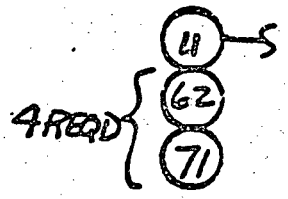
DESCRIPTION OF CHANGE

8) SH 2, ZN A5, ADDED CALLOUT

IS

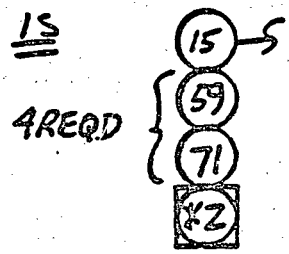


WAS

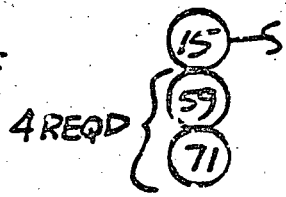


9) SH 2, ZN D4, ADDED CALLOUT

IS



WAS



10) SH 2, ZN D5, ADDED CALLOUT

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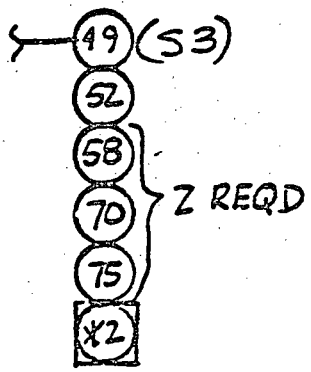

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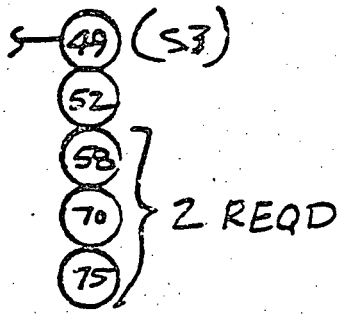

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SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528 A1

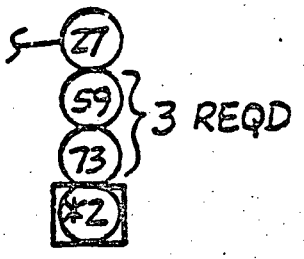
CODE IDENT 11033 SHEET 4

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

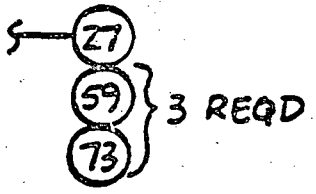
DESCRIPTION OF CHANGE

11) SH 2, ZN D5, ADDED CALLOUT

IS



WAS



12) SH 3, ZN D7, ADDED CALLOUT

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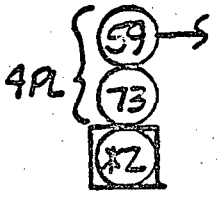

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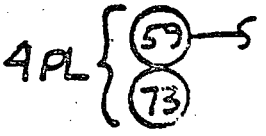

13) SH 3, ZN A7, ADDED CALLOUT

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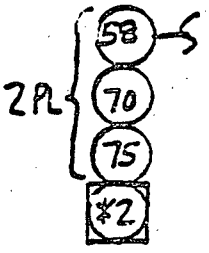

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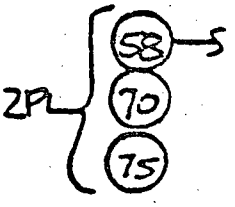
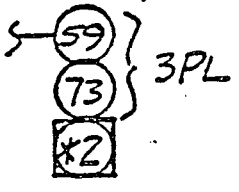
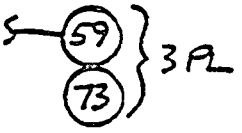


14) SH 3, ZN B6, ADDED CALLOUT





58150

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528A

CAGE IDENT 11223

SHEET 5

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

DESCRIPTION OF CHANGE

ORIGINAL PAGE IS OF POOR QUALITY

15) SH 3, ZN B5, ADDED CALLOUT

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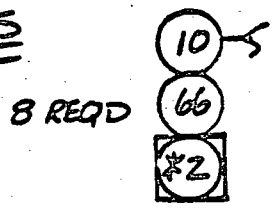

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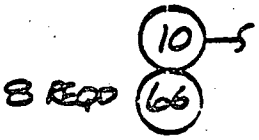

16) SH 3, ZN A5, ADDED CALLOUT

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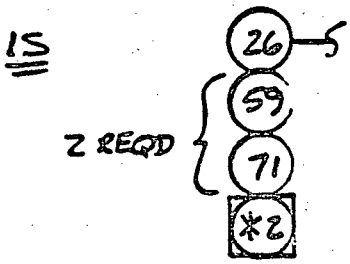

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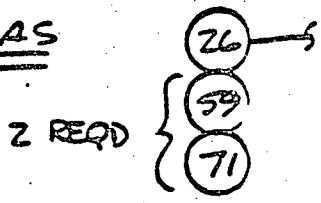

17) SH 3, ZN A4, ADDED CALLOUT

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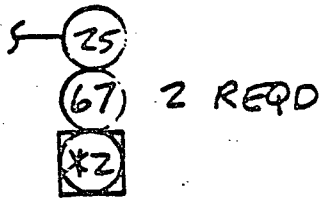

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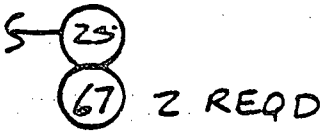

18) SH 3, ZN B2, ADDED CALLOUT

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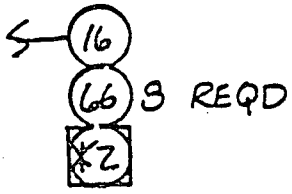

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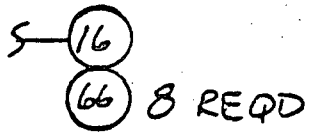


SBRC FORM NO. 033-1A (3-73)

58150

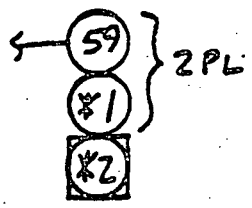
SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528

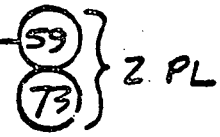
CODE IDENT NO. 11323 SHEET 6

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51790

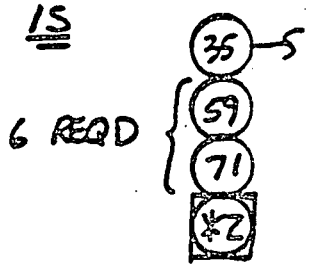
DESCRIPTION OF CHANGE

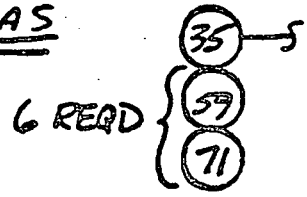
19) SH 4, ZN E6, ADDED CALLOUT, CHANGED CALLOUT

IS 

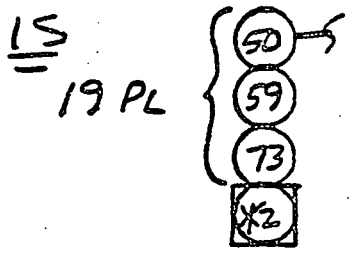
WAS 

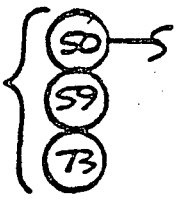
20) SH 4, ZN E7, ADDED CALLOUT

IS 

WAS 

21) SH 4, ZN D7, ADDED CALLOUT

IS 

WAS 

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SBRC FORM NO. 033-1A (3-73)

58150

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528A

CODE IDENT 11833 SHEET 7

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

DESCRIPTION OF CHANGE

22) SH 4, ZN A6, ADDED CALLOUT, CHANGED CALLOUT

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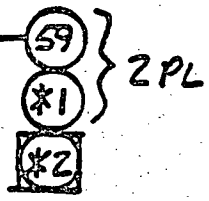

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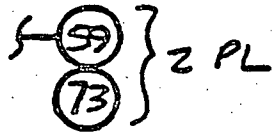

23) SH 5, ZN E3, ADDED CALLOUT

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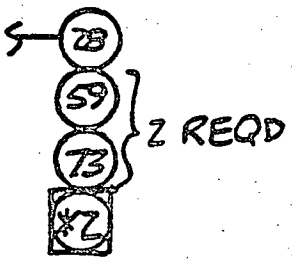

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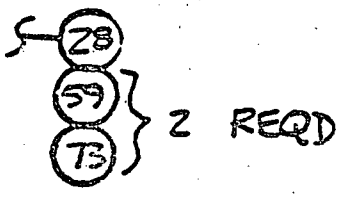

24) SH 5, ZN D7, ADDED CALLOUT

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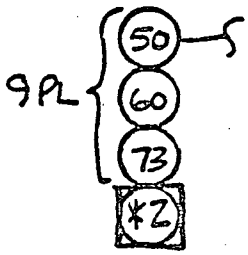

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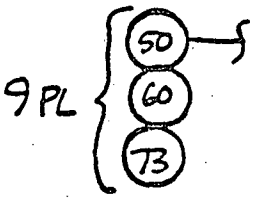

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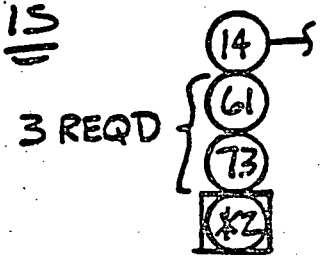
SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4578
CODE IDENT 11883 SHEET 8

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	S1740

DESCRIPTION OF CHANGE

25) SH 5, ZN C7, ADDED CALLOUT

IS



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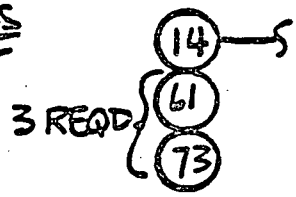

26) SH 5, ZN B7, ADDED CALLOUT

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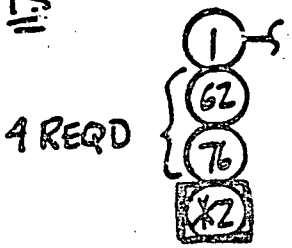

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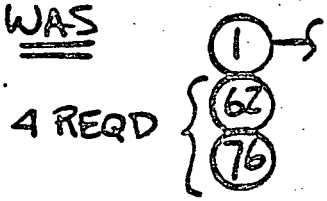

27) SH 5, ZN B4, ADDED CALLOUT

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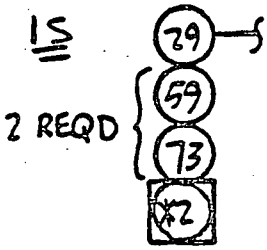

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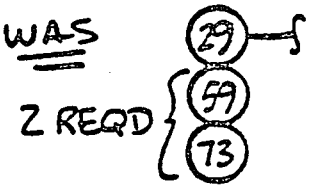

58150

SBRC ENGINEERING ORDER / REVISION NOTICE NO. 4528A

CODE IDENT 11838 SHEET 9

DRAWING TITLE: RADIATIVE COOLER DOOR ASSY

DRAWING NUMBER: 51740

DESCRIPTION OF CHANGE

28) SH 5, ZN B3, ADDED CALLOUT

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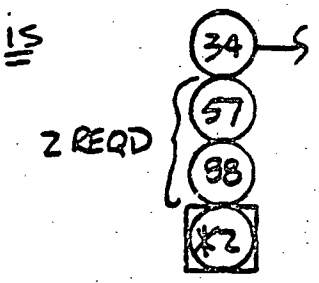

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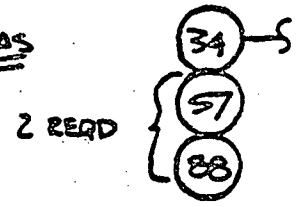

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29) SH 5, ZN C3, ADDED CALLOUT

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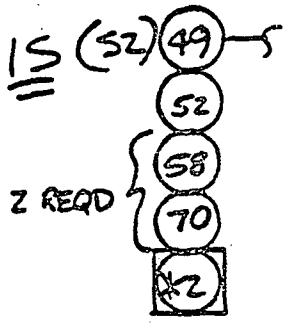

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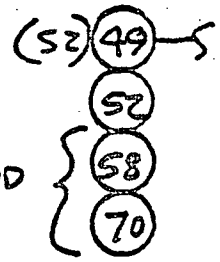

30) SH 5, ZN C2, ADDED CALLOUT

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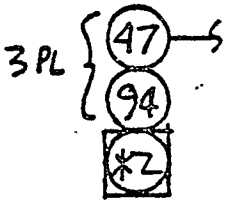

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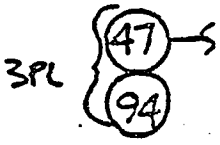

SBC FORM NO. 038-1A (3-73)

SB150

SBRC ENGINEERING ORDER ~~/ REVISION NOTICE~~ NO. 4528A

CODE IDENT 11223 SHEET 10

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

DESCRIPTION OF CHANGE

31) SH 6, ZN A5, ADDED CALLOUT

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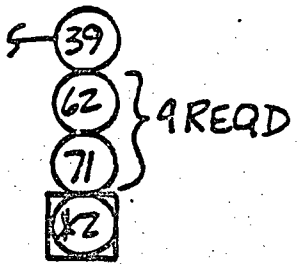

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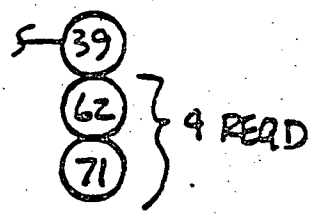

32) SH 6, ZN B3, ADDED CALLOUT

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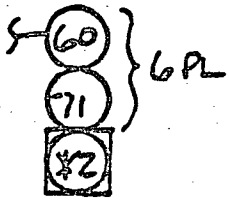

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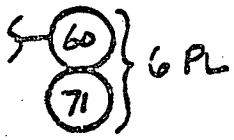

33) SH 6, ZN D3, ADDED CALLOUT

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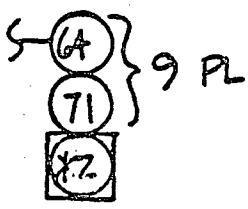

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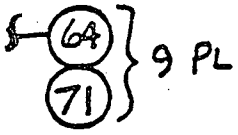

SB150

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4528A

CODE IDENT 11023 SHEET 11

DRAWING TITLE	DRAWING NUMBER
RADIATIVE COOLER DOOR ASSY	51740

DESCRIPTION OF CHANGE

34) SH 6, ZN F3, ADDED CALLOUT

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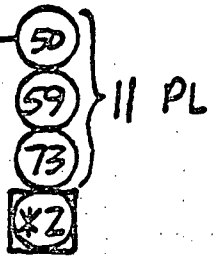

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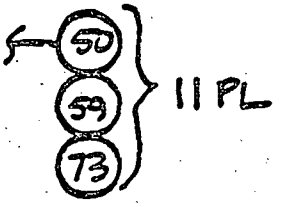

35) SH 6, ZN C1, ADDED CALLOUT, CHANGED CALLOUT

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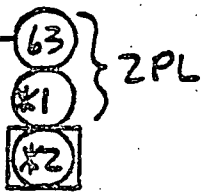

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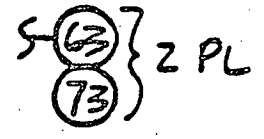

36) SH 7, ZN F6, ADDED CALLOUT

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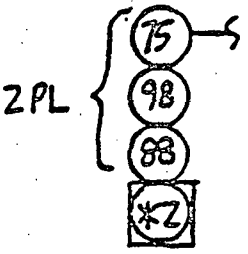

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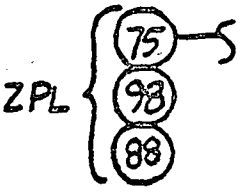

37) SH 7, ZN C4, ADDED CALLOUT

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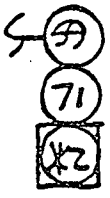
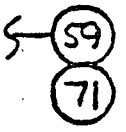


WAS



SBRC

ASSEMBLY HISTORY RECORD SUPPLEMENT

SHEET 1 OF 5

PART NUMBER	SERIAL OR LOT NUMBER	DRAWING NO.	DRAWING REVISION	EEA SOURCE CODE	PREPARED BY	SUPPLEMENT NO. 10 TO AHR DATED 15 Apr. 80
51740-1	003	51740	E	22-35	D. Dascomb	
ASSEMBLY NAME: DOOR ASSEMBLY, RADIATIVE COOLER			APPLICABLE EOs: 4528A	DESIGN ENG APPROVAL	QUALITY APPROVAL	SUPPLEMENT RELEASE DATE 9 July 1982
PURPOSE OF SUPPLEMENT - INCORPORATES NEW ASSY DWG REVISION ☐ OR EOs ☐; REWORK ☐; OTHER ☒. EXPLAIN:				PRODUCTION APPROVAL	PROJ ENG APPROVAL	NOTE TO PRODUCTION - UPON RECEIPT, ENTER SUPPLEMENT NO. AND RECEIPT DATE ON FRONT SHEET OF AHR. INITIAL THE ENTRY.
				OTHER	OTHER AFOSR	

NOTES: THE PURPOSE OF THIS AHR IS TO CHANGE WASHERS ON MAGNET BRACKETS AND BOND SCREWS TO PREVENT ROTATION OF SCREWS PER E.O.4528A, REF. FR S8150.

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY: OPER	INSP	DATE	REMARKS
		1) REVIEW HANDLING NOTES CALLED OUT ON ORIGINAL AHR,				
		51740, REV. C, DATED 15 APRIL 1980.				
		2) THIS SUPPLEMENT AHR IS TO BE PERFORMED AFTER THE				
		COMPLETION OF AHR SUPPLEMENT NO. 9 AND ALL PRIOR				
		AHR'S.				
		3) SEQUENCE OF OPERATIONS MAY BE ALTERED WITH THE				
		WRITTEN APPROVAL ON THE AHR BY THE R.E.A. AND P.Q.E.,				
		PROVIDED THAT INSPECTION AT A LATER TIME IS NOT				
		PRECLUDED.				

SB 0295C JAN 81

S8150

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 2 OF 5

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
51740-1	003	DOOR ASSEMBLY, RADIATIVE COOLER	AHR DATED AHR SUPPLEMENT NO. 10

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	DATE	REMARKS
17600	22-72	KIT NEW PART PER SUPPLEMENT NO. 6 ABCTR.	[signature]		7/9/82	
17700	51-41	Q.A. INSPECT KIT ABOVE.	[signature]	[signature] 172	7/9/82	
17800	22-74	REPLACE WASHERS, ITEM 73, WITH NEW WASHERS, ITEM *1, PER E.O.	[signature]		7/9/82	
		4528A, SIX PLACES SHOWN IN SHEET 4, ZONE E-6, SHEET 4, ZONE A-6,				
		AND SHEET 6, ZONE C-1. TORQUE SCREWS TO 5.5 IN-LBS PER SPEC				
		16357, REV B, PARA 3.1.1 AND PARA 3.1.1.4.				
17900	51-41	Q.A. INSPECT ABOVE AND WITNESS TORQUE.	[signature]	[signature] 172	7/9/82	

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5815

SBCC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 3 OF 3

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
51740-1	003	DOOR ASSEMBLY, RADIATIVE COOLER	AHR DATED AHR SUPPLEMENT NO. 10

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
18000	22-74	BOND SCREWS PER NOTE *2 OF E.O.4528A. ROOM TEMPERATURE CURE.	J.P.		7/9/82	ALL EXCEPT LAST TWO
		BOND SCREWS AS FOLLOWS:				
						MIX NO. 5403
		LOCATION ITEM NO. QTY.				
		SHEET 2 ZONE D7 65 4 ✓				
		2 D7 59 8 ✓				
		2 B7 64 9 ✓				
		2 B7 60 6 ✓				
		2 A5 62 4 ✓				
		2 D4 59 4 ✓				
		2 D5 58 2 ✓				
		2 D5 59 3 ✓				
		SHEET 3 D7 59 4 ✓				
		3 A7 58 2 ✓				
		3 B6 59 3 ✓				
		3 B5 66 7 8 ✓				
		3 A5 59 4 2 ✓				
		3 A4 67 4 2 ✓				

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5815

[SPEC]	ASSEMBLY HISTORY RECORD CONTINUATION SHEET			SHEET 4 of 7
PART NUMBER 51740-1	SERIAL OR LOT NUMBER 003	ASSEMBLY NAME DOOR ASSEMBLY, RADIATIVE COOLER	CONTINUATION OF: AHR DATED AHR SUPPLEMENT NO. 10	

OPER NO.	S/C NO.	INSTRUCTIONS				PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
18000	CONT.	LOCATION	ITEM NO.		QTY.				MIX NO. 5403
		SHEET 3	ZONE B2	66	(Deleted 7/Jan 87) ✓				
		4	E6	59	2 ✓				
		4	E7	59	6 ✓				
		4	D7	59	19 ✓				
		4	A6	59	2 ✓				
		SHEET 5,	ZONE E3	59	2 ✓				
		5	D7	60	9 ✓				
		5	C7	61	3 ✓				
		5	B7	62	4 ✓				
		5	B4	59	2 ✓				
		5	B3	57	2 ✓				
		5	C3	58	2 ✓				
		5	C2	94	3 ✓				
		SHEET 6	ZONE A5	62	4 ✓				
		6	B3	60	6 ✓				
		6	D3	64	9 ✓				
		6	F3	59	11 ✓				
		6	C1	*1	2 ✓				

5815D

SBAC

ASSEMBLY HISTORY RECORD CONTINUATION SHEET

SHEET 5 OF 5

PART NUMBER	SERIAL OR LOT NUMBER	ASSEMBLY NAME	CONTINUATION OF:
51740-1	003	DOOR ASSEMBLY, RADIATIVE COOLER	AHR DATED AHR SUPPLEMENT NO. 10

OPER NO.	S/C NO.	INSTRUCTIONS	PERFORMED BY OPER	PERFORMED BY INSP	PERFORMED BY DATE	REMARKS
18000	CONT.	LOCATION ITEM NO. QTY.				MIX NO. 5403
		SHEET 7 ZONE F6 98 2	[illegible]		7/17/80	
		7 C4 59 4				
18100	51-41	Q.A. INSPECT THE ABOVE OPERATION.		[illegible] 7/17/80	[illegible]	
18200	51-41	Q.A. REVIEW THIS SUPPLEMENT AHR FOR COMPLETENESS AND ROUTE TO				
		PROJECT QUALITY FILES. THIS AHR, WHEN APPROVED, COMPLETES THE				
		COOLER DOOR ASSEMBLY.				

5815D

BRC

AS-BUILT CONFIGURATION TRACEABILITY RECORD SUPPLEMENT

SHEET 1 OF 1

PART NUMBER	SERIAL OR LOT NUMBER	DRAWING NO.	DRAWING REVISION
51740-1	003	51740	E

GSA SOURCE CODE: 22-35

SUPPLEMENT NO. 6 TO ABCTR DATED 15 Apr. 80

PURPOSE OF SUPPLEMENT - INCORPORATES NEW ASSY DRAWING REVISION ☐ OR EOs ☒; REWORK ☐; OTHER ☐. EXPLAIN:

APPLICABLE EOs: 4528A

PREPARED BY: D. Dascomb

QUALITY APPROVAL: 7-9-82

SUPPLEMENT RELEASE DATE: 9 July 1982

NOTE TO PRODUCTION - UPON RECEIPT, ENTER SUPPLEMENT NO. AND RECEIPT DATE ON FRONT SHEET OF ABCTR. INITIAL THE ENTRY.

NOTES: THIS SUPPLEMENT ABCTR IS TO INCORPORATE CHANGES PER E.O.4528A.

ITEM	DRAWING/PART NUMBER	REV	DESCRIPTION	REF DESIG	PO/RR/LWO NUMBER	LOT/SERIAL NUMBER	QUANTITY REQ'D	QUANTITY ISSUED	INSP	DATE	REMARKS
*1	MS15795-804		WASHER, FLAT		402904 B5234		6	6	[illegible]	7/9/82	E.O.4528 A
73	MS15795-803		WASHER, FLAT	—	———		17	17			DECREASED QTY
			—								

5815D

SECTION 2.9
TOP OPTICAL ASSEMBLY

2.9.1 Top Optical Assembly

2.9.1.1

No performance data was taken at the subsystem level on this subsystem.

2.9.2
Acceptance Data

2.9.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

OPTICAL ASSEMBLY
52532 S/N 003

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
2	52532	OPTICAL ASSY - TM	F 3174A 4100A 4187A 4266A 4488A 4559A D-154 W-148 4656A	F 3174A 4100A 4187A 4266A 4488A 4559A D-154 W-148 4656A	F 3174A 4100A 4187A 4266A 4488A 4559A D-154 W-148 4656A	003
3	TP-32015-501	PRIME FOCAL PLANE COARSE FOCUS & FINE FOCUS TEST PROCEDURE 1A01R	G 4165A 4181A 4206A	G 4165A 4181A 4206A	G 4165A 4181A 4206A	
3	TP-32015-503	COLD FOCAL PLANE COARSE FOCUS AND CFPA TO PFPA ALIGN CHECK TEST PROCEDURE 1A03R	D	D	D	
3	TP-32015-504	COLD FOCAL PLANE FINE FOCUS AND PRELIM BAND REGISTRATION - CFPA TO PFPA ALIGN TEST PROCEDURE 1A04R	C	C		
3	TP-32015-608	TM MVNG, HANDLING & TRANSPORTATION	A	A	A	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	16357	PROCEDURE FOR GENERAL MECHANICAL ASSY OF THE TM	B	B	B	
3	16800	WORKMANSHIP SHAKEDOWN TEST PLAN AFT, OPTICS	A 4194A	A 4194A	A 4194A	
3	50844	RADIATION COOLER ADA	D	D	D	
3	50980	MODULE ASSY, PREAMP	E 2953A 4177A	E 2953A 4177A	E 2953A 4177A	201
3	51200	RAD COOLER ASSY	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	E 3922A 4201A 4216A 4269A SB-W032 W144 W147 W149 W151	003
3	51337	TELESCOPE ASSY	D 3866A 3917A *N2072A W129 W136	D 3866A 3917A W129 W136	D 3866A 3917A W129 W136	002
3	51512	AFT OPTICS	D 3646A 3896A 3925A 3959A 4134A	D 3646A 3896A 3925A 3959A 4134A	D 3646A 3896A 3925A 3959A 4134A	003

*N=Other "Non Mandatory" Change.

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	523532-097 -098 -099	SHIM	F 3174A 4100A 4187A 4266A 4490A 4488A	F 3174A 4100A 4187A 4266A 4490A 4488A	F 3174A 4100A 4187A 4266A 4490A 4488A	
3	52534	RELAY OPTICS ASSY	D 1145A 4097A	D 1145A 4097A	D 1145A 4097A	003
3	52787-001	CABLE HARNESS-PREAMP	C 3702A	C 3702A	C 3702A	201
3	52787-002	CABLE HARNESS-PREAMP	C 3702A	C 3702A	C 3702A	202
3	52787-003	CABLE HARNESS-PREAMP	C 3702A	C 3702A	C 3702A	203
3	52787-004	CABLE HARNESS-PREAMP	C 3702A	C 3702A	C 3702A	204
3	52788-001	CABLE HARNESS-PREAMP	C 3703A	C 3703A	C 3703A	202
3	52788-002	CABLE HARNESS-PREAMP	C 3703A	C 3703A	C 3703A	203
3	52788-003	CABLE HARNESS-PREAMP	C 3703A	C 3703A	C 3703A	203
3	52788-004	CABLE HARNESS-PREAMP	C 3703A	C 3703A	C 3703A	204
3	52884	CLAMP, STRAIN RELIEV	B 3252A	B 3252A	B 3252A	

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
3	53650	CABLE ASSY, INCHWORM	B 2887A 3728A 9273A	B 2887A 3728A 9273A	B 2887A 3728A 9273A	101
3	53697-001	TUBE CUPPORT-OPTICAL	A	A	A	
3	53697-002	TUBE SUPPORT-OPTICAL	A	A	A	
3	53700	RETAINER BEARING	A	A	A	
3	53701	PLATE MTG RIGHT	B	A 2380A	A 2380A	
3	53702	PLATE MTG LEFT	B	A 2381A	A 2381A	
3	53703	PLATE MTG RIGHT	B	A 2382A	A 2382A	
3	53704	PLATE MTG LEFT	B	A 2383A	A 2383A	
3	53705-001	HSG BEARING, OPT	A	A	A	
3	53705-002	HSG BEARING	A	A	A	
3	53706	CONNECTOR TUBE	A	A	A	
3	53707	COLLAR SUPPORT	A	A	A	
3	53752	RETAINER, MODULE-IPS	A 2278A 3433A	A 2278A 3433A	A 2278A 3433A	
3	54245	HSG BEARING	A	A	A	
3	54561	GROUND WIRE, RAD COOLER	A	A	A	201 202
3	53865	CABLE ROUTING & CLAMPING DIAGRAM	A 3322A	A 3322A	A 3322A	

Listing of Liens

TOP OPTICAL ASSEMBLY

P/N 52532

FLIGHT

Failure Reports Numbers		Deviations	Waivers
Open	Closed		
	F1764 S8361 S8405	D-154 D-156	W-145

TOP OPTICAL ASSY.

P/N 52532

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
	F1764		F0571		F0525
	S8371		F1739		F0529
	S8405		F2635		S8007
			F2647		
			F2725		
			S8085		
			S8089		
			S8097		

26 May 1982

1. ORIGIN (NAME AND ADDRESS)
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [X] DEVIATION [ ] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

MODEL/TYPE	b. CAGE CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
Flight-1	11323	TM	D-154

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT
6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN	11323	TP32015-514	

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.

9. TITLE OF DEVIATION/WAIVER
Use Optional AC07 Test Configuration for AC07 Testing

10. CONTRACT NO. & LINE ITEM
NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Thematic Mapper Assembly

CLASSIFICATION OF DEFECT

12. CD NO.

13. DEFECT NO.

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Optical Assembly

16. PART NO. OR TYPE DESIG.
52532

17. LOT NO.
N/A

18. QTY
1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
Reduces test effort by 2 to 3 days

21. EFFECT ON DELIVERY SCHEDULE

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
EXT: 61?:

78

23. DESCRIPTION OF DEVIATION/WAIVER
IA04 AC07 Configuration Options

Accept the attached HS236-8004 memo as sufficient test configuration modification description.

Relevant IA04 References:
1. D-151 Deviation prepared 11 May 1982.
2. HS236-7989 memo dated 11 May 1982.

ORIGINAL PAGE IS OF POOR QUALITY

use [illegible] 7 testing [illegible] ACC[illegible]

24. NEED FOR DEVIATION/WAIVER
he optical AC07 test configuration, delineated in the attached memo, ill facilitate the transition from presently occuring IA04 testing AC07 by allowing use of the IA04 configuration to the maximum tent possible. In addition, it will permit computer control of TM rn-on functions and thermal shutdown enablement.

REA [signature] SYS ENGR [signature] PE [signature]

RE [signature] 5/20/82
QA [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
ERNO 3 ONLY

SUBMITTING ACTIVITY AUTHORIZING SIGNATURE	TITLE
[signature] 6/2/82	Minor = System Engineering Major/Critical = Program Manager

27. APPROVAL/DISAPPROVAL

[ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

CONCURRENT ACTIVITY	SIGNATURE	DATE
GSA GSFC	George B. Scott	6/4/82

NSN 7540-01-144-1694

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
INTERNAL MEMORANDUM

TO: G.S. Plews CC: Distribution

DATE: 820527
REF: HS236-8004

FROM: J.C. Campbell

SUBJECT: AC07 Optional Test Configuration—
Bands 1-5, 7 Testing

BLDG: B11 MAIL STA. 78
EXT: 6151

REFERENCE: HS236-7989 IA04 Configuration Options

INTRODUCTION:

This memo describes a possible optional test configuration, TM to BTCE, that can be used for Bands 1-5, 7 testing during the AC07 test phase to support the presently defined AC07 data collection and also to provide the TM instrument with computer controlled power turn on and thermal shutdown capability. This configuration is based on reference memo HS236-7989 and is presented here in terms of existing configuration drawings and test procedures to the extent possible.

TEST CONFIGURATION

1. Configure TM & BTCE per drawing 3533100-300-2, but with the following possible exceptions:

FUNCTION	REQUIREMENT	DWG ZONE	CABLE#
X-Y ALIGN MONTR	NOT USED	B-19	W-109
VIDEO MONITOR	DON'T CARE	E-3	W2114-2
HDRR	DON'T CARE	F-10	(see DWG)
DEMUX	DON'T CARE	G-7	(see DWG)
TM MUX TST PTS	NOT USED	G-15	VERIFY DISCONN. W5002& W5003

2. Then refer to phase-I DWG 3533100-300-1, and make the following connections or changes:

FUNCTION	REQUIREMENT	DWG ZONE	CABLE or CONN#
B1 AOTS VIDEO	CONNECT	E/F-17	WTC30& 35
B2 AOTS VIDEO	CONNECT	E/F-17	WTC31& 36
B3 AOTS VIDEO	CONNECT	E/F-17	WTC32& 37
B4 AOTS VIDEO	CONNECT	E/F-17	WTC33& 38
B5 AOTS VIDEO	CONNECT	E/F-17	WTC-41
B7 AOTS VIDEO	CONNECT	E/F-17	WTC-42
AOTS DC RESTR	1 CONNECTION	E/F-15	W3050 to J410
AUTS TLMY	NOT USED	E/G-15	W3050(J102, J105, & J400)
AOTS VID OUT	CONNECT	F-15/17	W3035& W3036
AOTS IW COUNT	DON'T CARE	G-16	AOTS CONN B5-J5
DC RESTORE	CONNECT	E-19	W-139

3. Provide the following functions according to test procedure number TP32015-514:

   a) Install the SMACC per Appendix U: connect SMACC or SAMLOCK Drawer to penetration-plate connector P-10 via adapter cable # W3071. Ground the SMACC dc power return to the Collimator Ground Bus.
   b) Implement "Shutter Aside" via Appendix S, Method 3 at TM connector P45.

4. Install the BTC and CFPA Temp Sensor Converter per Appendix V of TP32015-504.

5. Bring TMT software up using TLMY stream #2.

TM COMMANDS REQUIRED:

Power the following TM functions ON:

TM-COMMANDS (ALL BANDS)

TM:001; PS1 ON
TM:004; Thermal Shutdown Enabled
TM:009; SME 1 ON / 2 OFF
TM:005; MUX ON (PS1)
TM:007; TLMY Scaling ON

The choice of this configuration is optional and is to be used at the Test Director's discretion. If its use fails to support the test adequately then the configuration shall be per phase - I DWG 3533100-300-1 as originally specified by TP32015-514.

Program Instruction 010

8

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 3-25-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Drive, Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
FLIGHT	11323	TM	W145

5. BASE LINE AFFECTED: [X] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM	11323	TP32015-501	Rev. G
c. TEST PLAN			

7. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	ADD. NO.

8. TITLE OF DEVIATION/WAIVER
Waiver from IA01R test procedure

9. CONTRACT NO. & LINE ITEM
NAS-5 2400

10. CONFIGURATION ITEM NOMENCLATURE
Optical Assembly

12. CB NO.

13. SERIES OF UNITS

14. EFFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED
Optical Assembly

16. PART NO. OR TYPE DESIG.
52532-D

17. LOT NO.
N/A

18. QTY
1

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
None

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Delete the Fine Focus (post-shimming) Test of Band 1, in Paragraph 5.5 of TP 32015-501(G) test procedure, for flight model only.

24. NEED FOR DEVIATION/WAIVER

1. Test equipment problem with collecting Band 1 video data.
2. Sufficient MTF focus data has been obtained from video collects of Bands 2,3 & 4.
3. To preclude schedule delay in starting next systems test, IA06R.

REA _____ SYS ENGR _____ PE _____

25. EFFECTIVITY BY SERIAL NUMBER
5|065 SN 003 ONLY

26. SIGNATURE OF ORIGINATOR'S REPRESENTATIVE AUTHORIZED TO SIGN FOR CONTRACTOR: 3/25/82
Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL, DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED [X] APPROVED [ ] DISAPPROVED

b. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: Lorne B. Gutt DATE: 3-30-82

DD FORM 1694

50984 jobs mtr 50980 jobs mtr 52532 optical assembly

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 1764

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM HS236 | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED | 5. DATE OBSERVED: MO 4 DA 17 YR 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☒ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☒ CARD	BAND 6 PREAMP	50984	101	SBRC
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: CH 4 -12VDC SHORTED TO GROUND

15. TEST PROCEDURE: 16378 PARA 4.1.1.3. | 16. ORIGINATOR: Stonaker | ORG 12213 | DATE 4-22-80 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS: CUT E JUMPER WAIVER W-033 (20 9532) WAS NOT INCORPORATED PRIOR TO APPLICATION OF POWER. THIS FAILURE QUALIFIES FOR FIRST STRESS ANALYSIS SHOWS NO PARTS OTHER THAN THOSE REPLACED WERE OVERSTRESSED. SEE HS 3274.

19. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED ESCAPED: Q2-4 AND R 6-4 REQUIRE REPLACEMENT WITH NEW FLIGHT COMPONENTS. THE SAME STRESS ANALYSIS FOR QA 201 (REF: MEMO HS236 6707) APPLIES TO THIS FAILURE. (COPY ATTACHED)

21. AUTHORIZATION: [signature] | ORG 122-17 | DATE 5-22-80 | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Returned to EO 9532 (4-18-80) REJECTED OK (5-11-80)

24. QA [signature] 5-11-80

25. QA [signature] 5-11-80

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

29. CAUSE AND CORRECTIVE ACTION: Roger Stonaker Jr. Roger Stonaker Jr. EO 9532 REFER TO CONTINUATION SHEET FOR CAUSE AND CORRECTIVE ACTION. ☐ CONTINUATION SHEET USED

30. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 9532 - EFFECTIVITY IS S/N 002 & UP

31. FRB CLOSURE: [signature] 11/13/81

32. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP ☐ TEST PROC. ☒ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

33. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 34. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

35. RESPONSIBLE ENGINEER: [signature] ORG 21-23 DATE 9-10-80 | 36. SPACECRAFT SYSTEM ENGR: W. A. Trevisani ORG 122-61 DATE 9/10/80

37. RELIABILITY: [signature] ORG 51 4 DATE 9-10-80 | 38. CUSTOMER OR SUPPLIER: RS. DATE 12/10/81

11873 SC JUL 78

HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO, CALIFORNIA

SPACE AND COMMUNICATIONS GROUP

FAILURE REPORT

CONTINUATION SHEET

FR SERIAL NO. F 1764

CONTINUATION SHEET LETTER

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN. DATE EACH ENTRY.

ADDITIONAL FR CONTINUATION SHEET(S) USED ☐

30	THE TEST ENGINEER MISTAKENLY TESTED FLIGHT PWB ASSY. S/N 101. HE SHOULD HAVE TESTED PROTOFLIGHT PWB ASSY. S/N 201 WHICH HAD E.O. 9532 INCORPORATED. AT THE TIME S/N 101 WAS TESTED E O 9532 HAD NOT BEEN INCORPORATED INTO THE BOARD, THEREFORE IT FAILED. [signature] 12/7/81
	C/A: DUE TO THIS MISTAKE PLUS OTHER SIMILAR MISTAKES THE RESPONSIBLE TEST ENGINEER HAS BEEN TERMINATED [signature] 12/7/81.

011873A JAN 80

SECTION 2.10
TELESCOPE ASSEMBLY

2.10.1 Telescope Assembly

2.10.1.1
No performance data was taken at the subsystem level on this subsystem.

2.10.2
Acceptance Data

2.10.2.1
Configuration Lists

AS-BUILT CONFIGURATION LIST

TELESCOPE ASSY

P/N 51337, S/N 002, FLIGHT

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
	51337	TELESCOPE ASSY	D + 3866A 3917A W-129 W-136	D + 3866A 3917A W-129 W-136	D + 3866A 3917A W-129 W-136	002
	50825-101	PRIMARY MIRROR	D + 3865A W-095 W-137	D + 3865A W-095 W-137	D + 3865A W-095 W-137	001
	50825-102	SECONDARY MIRROR	D + 3865A W-137	D + 3865A W-137	D + 3865A W-137	001
	50842	TELESCOPE HOUSING OPTICAL METERING	G	G	G	
	52753	THERMISTOR BLOCK ASSY	D + 3794A	D + 3794A	D + 3794A	304
	52958	THERMISTOR BLOCK ASSY	C + 3795A D-138	C + 3795A D-138	C + 3795A D-138	101 102 103
	52447	PLATE, SUPPORT	D	D	D	002
	52448	BLOCK, ADJUSTING	D	D	D	
	52449	ANGLE	A	A	A	
	52451	SCREW, SWIVEL	A	A	A	
	52452	PIN, INDEX	A	A	A	
	52453	CYLINDER, SPRING	A	A	A	
	52454	NUT, SWIVEL	A	A	A	
	52455	WASHER, SPECIAL	A	A	A	
	52456	BRACKET, PIVOT	A	A	A	

P/N 51337

IND LVL	PART NO.	NOMENCLATURE	CURRENT REVISION	ACCEPT. REVISION	AS-BUILT REVISION	SERIAL NUMBER
2	52457	PLUNGER, SPRING	A	A	A	
2	52458	BLOCK, PRESSURE	A	A	A	
2	52459	BLOCK, ADJUSTING	B	B	B	
2	52460	CUSHION, ADJUSTER	A	A	A	
2	52461	SCREW, ADJUSTING	A	A	A	
2	52463	CLIP, LOCATING	A	A	A	
2	52464	WASHER, SPECIAL	A	A	A	
2	52516	BAFFLE, SECONDARY MIRROR	C	C	C	001
2	52860 -1&-2	PLUG, MIRROR MOUNT	A	A	A	
2	53514	MASK, PRIMARY MIRROR	B	B	B	
2	53696	BAFFLE, TELESCOPE HOUSING	A	A	A	
2	51335-1	THERMISTOR, PRECISION (SCD)	D	D	D	138
2	51808	TERMINAL, INSUL, PRESS MOUNT	B	B	B	

2-10-82

R.L. Dick
Quality Assurance

2-11-82

E.J. Vergara
Configuration/Data Management

Listing of Liens

TELESCOPE ASSEMBLY

P/N 51337

FLIGHT

Failure Reports Number	
Open	Closed
	F0530
	F0552
	F0591
	F1742
	S8084

Deviations	Waivers
D-138	W-129
	W-136
	W-137

TELESCOPE ASSEMBLY

P/N 51337

FLIGHT Failure Report No.		PROTOFLIGHT Failure Report No.		ENGINEER Failure Report No.	
Open	Closed	Open	Closed	Open	Closed
	F0530		F1765		F0513
	F0552		S8006		
	F0591				
	F1742				
	S8084				

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 1-20-82

PROCURING ACTIVITY NO.: 8

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center
75 Coromar Dr. Goleta, Ca. 93117

2. [X] DEVIATION [ ] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER				5. BASE LINE AFFECTED			6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED
a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.	[ ] FUNCTIONAL	[ ] ALLOCATED	[X] PRODUCT	[ ] YES [X] NO
F-1	11323	TM	D-138				

7. SPECIFICATIONS AFFECTED-TEST PLAN				8. DRAWINGS AFFECTED			
	MFR. CODE	SPEC./DOC. NO.	SCN	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM							
b. ITEM				11323	51337	D	
c. TEST PLAN							

9. TITLE OF DEVIATION/WAIVER
Documentation Deficiency of Telescope Thermistors

10. CONTRACT NO. & LINE ITEM
NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Thematic Mapper Assy

CLASSIFICATION OF DEFECT

12. CD NO.: II

13. DEFECT NO.:

14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Thermistor Block Assy

16. PART NO. OR TYPE DESIG.: 52958-C

17. LOT NO.:

18. QTY: 3

19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
No Effect

21. EFFECT ON DELIVERY SCHEDULE
8 weeks if not approved.

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
No Effect

23. DESCRIPTION OF DEVIATION/WAIVER
The Assembly History Record (AHR) for the installation of three Thermistor Block Assemblies (P/N 52958) into the Telescope Assembly cannot be located.

24. NEED FOR DEVIATION/WAIVER
Sufficient documentation is available to insure flight quality of assembled thermistors (MR# 117487). In addition, Revision "C" status of P/N 52958 was confirmed on each of three assemblies by resistance measurements and visual inspection.

REA James W. Balinski SYS ENGR L L Ernst

RE 1/21/82

QA 2-5-82

PE 2-8-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: L L Ernst

TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC

SIGNATURE: George B. Gault

DATE: 3/11/82

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR -481 FOR INSTRUCTIONS)

DATE PREPARED: 1-8-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER
75 COROMAR DR. Goleta, CA 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F1	11323	TM	W-129

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [X] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	51337	D	

9. TITLE OF DEVIATION/WAIVER
TELESCOPE HOUSING BLACK PAINT FLAKING

10. CONTRACT NO. & LINE ITEM
NAS5-24200

11. CONFIGURATION ITEM NOMENCLATURE
THEMATIC MAPPER ASSY

CLASSIFICATION OF DEFECT

12. CD NO. | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. REQUIRING DEVIATION/WAIVER
TELESCOPE ASSY	51337-D		-1-	[ ] YES [X] NO

20. EFFECT ON COST/PRICE

21. EFFECT ON DELIVERY SCHEDULE
3 weeks if disapproved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.

23. DESCRIPTION OF DEVIATION/WAIVER

As a result of extensive handling and rework of Telescope Housing, several areas on the aluminum and Invar flanges have experienced black paint flaking (or chipping). All loose paint on invar parts and all exposed paint on aluminum flange has been removed per MRCO 294836R. Poor adhesion of the black optical paint to these aluminum and Invar parts in the Telescope Housing has resulted in general delamination of the paint during tape testing.

24. REASON FOR DEVIATION/WAIVER

Repainting exposed surfaces is impractical and not recommended as considerable disassembly would be required to avoid possible contamination of optical surfaces. Surface of aluminum flange can be left without finish since the telescope's graphite epoxy structure already requires a low humidity environment, by design less than 50% relative humidity. No operations will occur which would cause direct exposure to moisture. Invar surfaces left unpainted will cause neither optical nor corrosion problems.

REA W. Balicki SYS ENGR J. Conrad PE M. Weiss / L. Beaman 1/11
QA W. Adams 1/11/82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN C03 ONLY

CM C. Linares

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. Conrad 12 Jan 82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED

b. [X] APPROVED [ ] DISAPPROVED

c. DEVELOPMENT ACTIVITY: NASA GSFC

SIGNATURE: Frank B. Lutz DATE: 1/15/82

DD FORM SEC. 1694

HUGHES
HUGHES AIRCRAFT COMPANY

NONCONFORMING MATERIAL REPORT (NCMR)

NO. 20[illegible]
DATE 1-4-82
PAGE ____ OF ____

PROGRAM ID TM V412 7PRG

PART NO.	S/N	ENG. CHANGES	NOMENCLATURE
51337 REV D	002		TELESCOPE ASSEMBLY

WORK ORDER DOC NO.	LOT SIZE	QTY. SUSP.	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
		1	TM CLEAN ROOM		ANRS 51337 ORIGINAL TIO

SUPPLIER	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO.	ITEM NO.	R.R. NO.
	S.B.R.C.				

ITEM NO.	QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	COD
1	1	1	FLAKING PAINT ON ALUMINUM AND INVAR FLANGE SURFACES ON OUTSIDE HOUSING.		-0-	MRB	G
2	1	1	AOB MOUNTING PADS HAVE SCRATCHES ON PAINTED SURFACES.		-0-	MRB	G

ORIGINATOR R. L. Neil DATE 1-4-82 | QUALITY M. D. Weiss DATE 1-4-82 | ENGINEERING N. Balinski DATE 1-5-82

ITEM NO.	DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
1,2	E	REMOVE LOOSE PAINT AS REQD FROM TELESCOPE-TO-MAINFRAME BOLT CIRCLE PER MRCD. (ADDITIONAL ENG & TOUCH-UP)	
2	B	REMOVE LOOSE PAINT AS REQD FROM AOB MOUNTING PADS PER MRCD, AND USE AS IS (O.K. PER TELECON WITH M. WEISS ON 1-5-82)	

ENGINEERING N. Balinski DATE 1-5-82 | QUALITY S H Brandt DATE 1-5-82 | CUSTOMER V. Miller AFOM DATE 1-5-82

ITEM NO.	CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION / CORRECTIVE ACTION
1,2	EXCESSIVE REWORK (DAMAGED PRIMARY MIRROR) AND HANDLING TELESCOPE ASSY TO OPEN MAINFRAME MOUNTING HOLES	THIS WAS AN ISOLATED INSTANCE OF FLAKING PAINT DUE TO UNUSUALLY ROUGH ATTEMPTED REPAIR, AND WILL NOT BE REPEATED IN THE FUTURE

SIGNATURE [illegible] S H Brandt DATE 1/5/82 | SIGNATURE S H Brandt DATE 1-5-82

RESPONSIBILITY VENDOR	RESPONSIBILITY HAC	DEBIT VENDOR YES	DEBIT VENDOR NO	DISP.CODE	VENDOR PACKING SHEET	QTY. R.T.V.	QTY. SCRAP	BUYERS SIGNATURE	DATE	COPY
☐	☐	☐	☐							

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MATERIAL REVIEW CONTROL ORDER

MRCO 294836R W/A V412

PART NO. 51337 REVISION D

PART NAME TELESCOPE ASSY

QUANTITY 1 S/N 002

ROUTE TO: DON DASCOMB

P.O. MASTER CLEARED

	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
12-74	10	COVER SCAN MIRROR END					
		OF TELESCOPE ASSY WITH					
		A FLIGHT APPROVED PLASTIC					
		AND INSTALL & CLEAN DRY					
		NITROGEN PURGE SYSTEM					
		TO PROTECT MIRRORS FROM					
		CONTAMINATION DURING					
		PAINT REPAIR WORK.					
		AFQA TO BE NOTIFIED					NOTIFY NASA OF
1-4	20	Q.A. INSPECT PURGE ARMS					TAPE TEST RESULT
		AND PERFORM TAPE TEST IN AREA OF SCRATCHES					
1-74	30	MECHANICALLY REMOVE					USE VACUUM TUBE
		ALL LOOSE PARTICLES OF					& VERIFY NO PAINT IS PEELING
		PAINT IN AREA OF SCRATCHES					
		ON THE MOUNTING RING					
		FOR THE AFT OPTICS BULK-					
		HEAD (AOB INSIDE HOUSING)					
LAST OPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORD CLEARANCE					

SB 0344-B-1 FEB 78

QA APPROVAL S/H Brandt DATE 1-5-82

ENG APPROVAL W. Balinski DATE 1-5-82

J.T.

MATERIAL REVIEW CONTROL ORDER **MRCO** 2 9 4 8 3 6 R
W / A V 4 1 2

CONTINUATION SHEET

	OPR NO.	INSTRUCTIONS	DATE	QTY ACC	QTY SUS	INSP OPER	COMMENTS
22-74	40	MECHANICALLY REMOVE					USE VACUUM TYPE
		ALL LOOSE PAINT PARTICLES					& VERIFY NO PAINT IS PEELING
		ON THE OUTSIDE SURFACE					
		OF THE TELESCOPE MOUNTING					
		RINGS (ALUM & INVAR).					
51-41	50	Q.A. INSPECT ABOVE TWO OPR.					
22-74	60	TOUCH UP CHROMATE					
		CONVERSION COAT (ALODINE)					
		ALUM TELESCOPE MOUNTING					
		RING PER NOTE 11 OF					
		DRAWING 50842 REV G.					
		~~AFQA AND SBRO~~					
51-41	70	Q.A. INSPECT ABOVE OPR.					
		AND PERFORM TAPE TEST ON PAINT ACROSS ALODINED AREAS.					
22-74	80	REMOVE N_2 PURGE					
		INSTALLED IN OPR 10.					
LAST OPR		RETURN THIS CARD TO MATERIAL REVIEW FOR RECORD CLEARANCE.					

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-17-82

PROCURING ACTIVITY NO.: H-50

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER
75 COROMAR DR. GOLETA, CAL. 93117

2. [ ] DEVIATION [X] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F-1	11323	HS236	W-136

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM		TP32015-612	F
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

	MFR. CODE	NUMBER	REV.	NOR. NO.
a. SYSTEM	11323	51337	D	EO's 3866A,39
b. ITEM				
c. TEST PLAN				

9. TITLE OF DEVIATION/WAIVER
Low Value for Telescope MTF

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Thematic Mapper Assy

CLASSIFICATION OF DEFECT
12. CD NO.: II
13. DEFECT NO.:
14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Telescope Assy
16. PART NO. OR TYPE DESIG.: 51337-D
17. LOT NO.:
18. QTY: -1-
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
-2 months min. if not approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Telescope single pass MTF is computed to be 0.87 along track and 0.88 cross track at a system frequency of 11,765 cycles/radian. TP32015-612 requirement is 0.85 along track and 0.90 cross track. Subsequent analysis indicates that computed F-1 MTF is adequate to produce a predicted system level SWR which will meet system requirements of $\geq$ 0.35 at 11,750 cycles/radian with margin. (Ref. HS236-7831 J.B. Young to J. Engel, Summary of MTF Performance for FM1 Telescope, dated 9 February 1982.)

24. NEED FOR DEVIATION/WAIVER
This waiver is needed to avoid costly and time consuming rework which would have catastrophic impact on the entire Thematic Mapper program. The out-of-spec condition cannot be improved significantly without replacing the telescope optical system and/or reworking the Main Frame mounting surfaces. This would involve a minimum of 2 months delay aud at least $100,000 additional costs.

RE [signature] 2/
QA [signature] 2/18/82
REA W. Belinski SYS ENGR JB Young PE [signature]

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: [signature] 2/18/82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: [signature] DATE: 2/16/82

DD FORM 1694

Program Instruction 010

REQUEST FOR DEVIATION/WAIVER (SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS) | DATE PREPARED: 19 February 1982 | PROCURING ACTIVITY NO.: 1.8.5

1. ORIGINATOR NAME AND ADDRESS
Santa Barbara Research Center, 75 Coromar Drive, Goleta, CA 93017

2. [ ] DEVIATION [X] WAIVER
3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F-1	11323	TM	W-137

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [ ] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM			
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	NOR. NO.
11323	50825	D	

9. TITLE OF DEVIATION/WAIVER
Reflectance of Telescope Optics

10. CONTRACT NO. & LINE ITEM
NAS5-24200
Data Item 32

11. CONFIGURATION ITEM NOMENCLATURE
Radiometer, Thematic Mapper

CLASSIFICATION OF DEFECT

12. CD NO.	13. DEFECT NO.	14. DEFECT CLASSIFICATION
II		[X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED	16. PART NO. OR TYPE DESIG.	17. LOT NO.	18. QTY	19. RECURRING DEVIATION/WAIVER
Telescope System	50825		1	[ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
None, if approved

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
The measured reflectance on the delivered optical elements is lower than specified. The scattering from the surface is greater than allowed in the specification. It is requested that the Telescope system be used in its existing condition.

(Ref: NCMR #280985)

24. NEED FOR DEVIATION/WAIVER
Technical details in HS 236-6160 and HS 236-6165 show that the telescope is usable in present condition. Rework would create extensive schedule delays. Analysis indicates no evidence of system performance degradation below system specification.

SE J. L. Engel 2-19-82
QA W. Williams 2-19-82
REA W. Balinski SYS ENGR J. L. Engel PE W. Williams for L. Bradford 2-18-82

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
Serial No. 002

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. L. Engel 2/19/82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [ ] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: George B. Britt
DATE: 2/19/82

DD FORM 1694

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HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 0530

ORIGINATOR

1. PROGRAM NAME AND NUMBER: THEMATIC MAPPER | 2. GLA | 3. MODEL: E-1 | 4. TIME OBSERVED: 1700 | 5. DATE OBSERVED: 5 MO 3 DA 80

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	TELESCOPE/MAIN FRAME	50837/51337	002	SBRC
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROGRESS ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ ENCAPS ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ MIN ☐ THERMAL VAC ____ HRS. AT ____ ° ____ TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: MTF TEST INDICATES THAT PRIMARY MIRROR WAS DISTORTED WHEN TELESCOPE WAS MATED TO MAIN FRAME. CROSS RACK AND ALONG FOCAL PLANES OFFSET 0.009 INCH FROM EACH OTHER.

15. TEST PROCEDURE: TP32015-612 PARA 4.3 | 16. ORIGINATOR: T DWISE | ORG: SBRC | DATE: 5/5/80 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: IT IS SUSPECTED THAT THE FIT OF THE TELESCOPE ASSY TO THE MAIN FRAME MAY CONTRIBUTE TO THE DISTORTIONS. MIRROR ASSEMBLIES WILL BE BONDED WITH TELESCOPE INSTALLED IN THE MAIN FRAME.

18. FAILED ITEM NAME AND PART NUMBER: Telescope P/N 51337

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: SYSTEMS EVALUATION OF THE DISTORTIONS INDICATES THAT IT IS ACCEPTABLE AND WITHIN ERROR REQUIREMENTS. REFER TO HAC 336-7831 J. R. YOUNG TO J. ENGEL, SUMMARY OF MTF PERFORMANCE FOR TELESCOPE. (COPY ATTACHED)

21. AUTHORIZATION: [signature] | ORG: 122-31 | DATE: 10-19-81 | ☐ CONTINUATION SHEET USED

MANUFACTURING/QA TEST

23. REWORK/RETEST ACTION TAKEN: NC REWORK REQ'D. FINAL MTF TESTING SHOWS THAT MIRROR PERFORMANCE IS ACCEPTABLE FOR USE (REF W-136)

24. QA REWORK

[signature] 2-23-82

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PREGNANCY DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: CAUSE: OUT-OF-FLATNESS CONDITION (LESS THAN 0.001 INCH) BETWEEN TELESCOPE MOUNTING FLANGE AND MAIN FRAME MOUNTING SURFACE.

CORRECTIVE ACTION: ASSEMBLY TECHNIQUE HAS BEEN CHANGED TO BOND THE MIRROR AFTER THE TELESCOPE HAS BEEN BOLTED TO ITS INTERFACE. THIS TECHNIQUE WAS SUCCESSFULLY USED FOR THE PROTOFLIGHT ASSEMBLY. [signature] 10-19-81

REV B

☐ CONTINUATION SHEET USED

33. FRB CLOSURE: [signature] 10/20/80

31. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: AHR 51337 (RELEASE DATE: 12/5/80)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☐ TEST PROC. ☐ TEST SET-UP ☒ MFG. PROCEDURE ☐ ASSY/PAB ERROR ☐ WORKMANSHIP ☐ WRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN

DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: [signature] | ORG: 122-35 | DATE: 9-9-81

38. SPACECRAFT SYSTEM ENGR.: [signature] | ORG: 122-61 | DATE: 8/10

39. RELIABILITY: [signature] | ORG: 51-11 | DATE: 9-9-81

40. CUSTOMER OR SUPPLIER: [signature] | DATE: 2-23-82

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W 136

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATION GROUP

FAILURE REPORT

F 0552

ORIGINATOR

1. PROGRAM NAME AND NUMBER: TM PL1162 | 2. GLA | 3. MODEL: FLT | 4. TIME OBSERVED: 6 days | 5. DATE OBSERVED: MO 01 DA 26 YR 82

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☐ UNIT ☒ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANFACTUER
7. SUBSYSTEM				
8. UNIT				
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	Telescope/Main Frame	51337	002	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN-PROGRESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMPERATURE ____ ° ____ AXIS FOR ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ MIN 0.87 TYP ☐ OTHER 0.88

14. DESCRIPTION OF FAILURE: Telescope single pass MTF is ~~0.84~~ 0.84 along track and ~~0.86~~ 0.86 cross track. (Measurements made at system frequency of 11,765 cycles/radian.) Specification (TP) requirement is 0.85 along track and 0.90 cross track.

15. TEST PROCEDURE: TP32015-612 PARA 3.2 | 16. ORIGINATOR: J. Campbell | ORG 22-22 | DATE 1/28/82 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

17. VERIFICATION AND FAILURE ANALYSIS: Remeasurements and subsequent analysis indicates that measured Flight Model MTF is adequate to produce a predicted system level SWR which will meet system requirements of ≥ 0.35 at 11,750 cycles/radian with a margin.

18. FAILED ITEM NAME AND PART NUMBER:

19. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE: Refer to attached HS236-7831 - J. B. Young to Jr. Engel, Summary of MTF Performance for FM1 Telescope, dated 9 February 1982. ~~Current~~ MTF is acceptable per waiver W 136.

21. AUTHORIZATION: J. C. Campbell | ORG 22-22 | DATE 2-10-82 | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: None - ~~Full~~ ~~Spectral~~ ~~Cross~~ Track MTF measurement acceptable per waiver W 136.

24. QA REWORK

25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Specification requirements were higher than required for operation within system specifications. ~~EC 4134 4~~ W 136 effectivity is SN FLT ~~1~~ ~~thru~~ ~~005~~ MTF acceptable per waiver W 136 d.c.

31. FRB CLOSURE: 7/20/82

32. DOCUMENT REPLENISHING CORRECTIVE ACTION: ~~EC 4134 4~~ W 136 effectivity is SN FLT

33. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIP. ☒ TEST PROC. ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN | DEFECT CODE

34. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☒ NO FAILURE

35. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE QA: M. Balinski | ORG 22-35 | DATE 2-15-82

38. SPACECRAFT SYSTEM ENGR: J. Campbell | ORG 22-41 | DATE 2/19/82

RELIABILITY: [illegible] | ORG 51 41 | DATE 2-15-82

40. CUSTOMER OR SUPPLIER: | DATE

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Program Instruction 010

REQUEST FOR DEVIATION/WAIVER
(SEE MIL-STD-480 OR 481 FOR INSTRUCTIONS)

DATE PREPARED: 2-17-82

PROCURING ACTIVITY NO.:

1. ORIGINATOR NAME AND ADDRESS
SANTA BARBARA RESEARCH CENTER
75 COROMAR DR. GOLETA, CAL. 93117

2. [ ] DEVIATION [X] WAIVER

3. [X] MINOR [ ] MAJOR [ ] CRITICAL

4. DESIGNATION FOR DEVIATION/WAIVER

a. MODEL/TYPE	b. MFR. CODE	c. SYS. DESIG.	d. DEV/WAIVER NO.
F-1	11323	HS236	W-136

5. BASE LINE AFFECTED: [ ] FUNCTIONAL [ ] ALLOCATED [X] PRODUCT

6. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED: [ ] YES [X] NO

7. SPECIFICATIONS AFFECTED-TEST PLAN

	MFR. CODE	SPEC./DOC. NO.	SCN
a. SYSTEM		TP32015-612	F
b. ITEM			
c. TEST PLAN			

8. DRAWINGS AFFECTED

MFR. CODE	NUMBER	REV.	MOD. NO.
11323	51337	D	EO's 3866A,39

9. TITLE OF DEVIATION/WAIVER
Low Value for Telescope MTF

10. CONTRACT NO. & LINE ITEM
NAS 5-24200

11. CONFIGURATION ITEM NOMENCLATURE
Thematic Mapper Assy

CLASSIFICATION OF EFFECT

12. CD NO. II | 13. DEFECT NO. | 14. DEFECT CLASSIFICATION: [X] MINOR [ ] MAJOR [ ] CRITICAL

15. NAME OF PART OR LOWEST ASSEMBLY AFFECTED: Telescope Assy
16. PART NO. OR TYPE DESIG.: 51337-D
17. LOT NO.:
18. QTY: -1-
19. RECURRING DEVIATION/WAIVER: [ ] YES [X] NO

20. EFFECT ON COST/PRICE
None

21. EFFECT ON DELIVERY SCHEDULE
2 months min. if not approved-

22. EFFECT ON INTEGRATED LOGISTIC SUPPORT, INTERFACE, ETC.
None

23. DESCRIPTION OF DEVIATION/WAIVER
Telescope single pass MTF is computed to be 0.87 along track and 0.88 cross track at a system frequency of 11,765 cycles/radian. TP32015-612 requirement is 0.85 along track and 0.90 cross track. Subsequent analysis indicates that computed F-1 MTF is adequate to produce a predicted system level SWR which will meet system requirements of $\geq$ 0.35 at 11,750 cycles/radian with margin. (Ref. HS236-7831 J.B. Young to J. Engel, Summary of MTF Performance for FM1 Telescope, dated 9 February 1982.)

24. NEED FOR DEVIATION/WAIVER
This waiver is needed to avoid costly and time consuming rework which would have catastrophic impact on the entire Thematic Mapper program. The out-of-spec condition cannot be improved significantly without replacing the telescope optical system and/or reworking the Main Frame mounting surfaces. This would involve a minimum of 2 months delay and at least $100,000 additional costs.

RE [signature] 2/18/82
QA [signature] 2/18/82
PE [signature]

REA W. Belinski SYS ENGR JB Young

25. PRODUCTION EFFECTIVITY BY SERIAL NUMBER
51065 SN 003 ONLY

26. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE: J. Engel 2/18/82
TITLE: Minor - System Engineering
Major/Critical - Program Manager

27. APPROVAL/DISAPPROVAL

a. [ ] APPROVAL RECOMMENDED
b. [X] APPROVED [ ] DISAPPROVED

c. GOVERNMENT ACTIVITY: NASA GSFC
SIGNATURE: [signature] DATE: 2/18/82

DD FORM 1694

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company

INTERNAL MEMORANDUM

F552

TO: J. Engel

CC: L. Candell
R. Thomsen

DATE: 9 February 1982
REF: HS236-7831
2221-506

FROM: J. B. Young

SUBJECT: Summary of MTF Performance for FMI Telescope

BLDG. B11 MAIL STA. 78
EXT. 6180

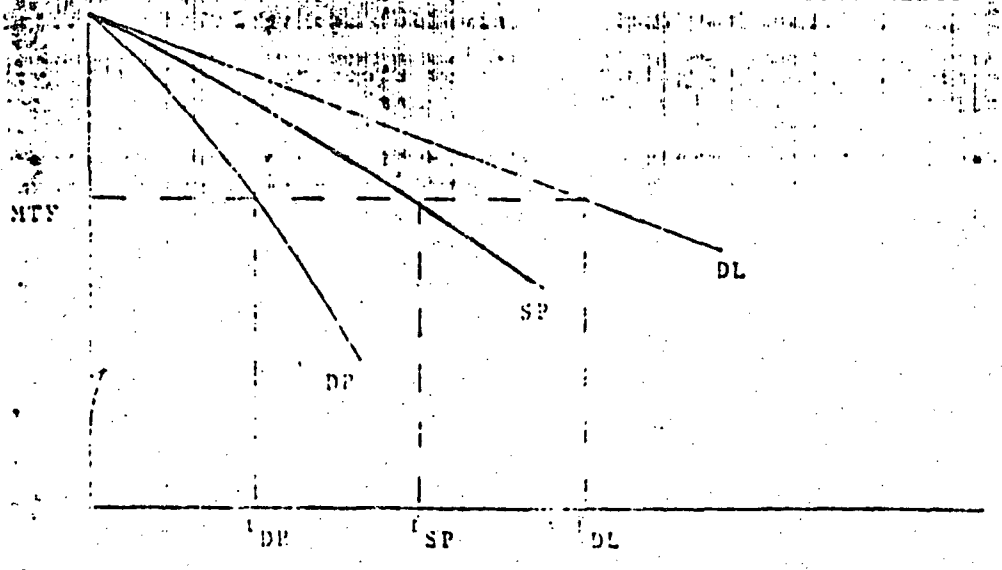
Introduction

During the measurement of TM flight model (FMI) telescope EFL/MTF performance it was noted that its MTF was lower than the TM Protoflight (PFM). The MTF values for the spatial frequency of 11,750 cycles/radian were 0.86 (subsequently revised to 0.88) and 0.94 for FMI and PFM, respectively. Failure report, F0552 was initiated. Additional MTF measurements were then completed using special test request, STR #F1-002. The purpose of the additional measurements and associated analyses were to assess whether TM FMI sensor would pass the square wave response (SWR) of $\geq$ 0.35 @ 11,750 cycles/radian in the final thermal vacuum (T/V) performance tests.

Discussion

The measurement of MTF at the telescope level is accomplished in a double pass mode, see TP 32015-612 for a detailed description. The measured MTF in double-pass must be converted to single pass MTF. Figure 1 conceptually illustrates the relationship between MTF_{DP} (double pass), MTF_{SP} (single pass), and MTF_{DL} (diffraction limited).

Figure 1. Relationship of MTF vs Spatial Frequency between Double Pass, Single Pass and Diffraction Limited Performance



F552

Summary of MTF Performance for FM1 Telescope

The expression used to calculate f_{SP} is

$$f_{SP} = \left[\left(f_{DP}^{-2} - f_{DL}^{-2} \right)^{-1/2} - f_{DL}^{-2} \right]^{-1/2} \qquad (1)$$

where f_{DP} is a measured parameter and f_{DL} is approximated by

$$f_{DL} = 310.50\ (1 - MTF) \quad \text{for MTF} > 0.60 \qquad (2)$$

and spatial frequency is in units of kilocycles per radian.

Table I is a tabulation of the f_{SP} vs MTF. Equation (1) was used to convert double pass to single pass values except for the MTF listed for a spatial frequency of 11.75 K cycles/radian. These values were obtained by linear interpolation from adjacent points. The tabulated data includes Y (along scan) and X (cross scan) axes. Peripheral data is given, such as: time, Z axis location, and field angle. The last column notes the telescope configuration, principally, the telescope/mainframe interface bolt torque status.

It should be noted that FM-1 telescope optical system has appreciable astigmatism, even though the data tabulated in Table I shows very little. This is due to the astigmatism axis being about 30 degrees to the Y axis.

The TM PFM data has been used in an attempt to extrapolate whether the TM FM-1 performance will pass the specification of SWR $\geq$ 0.35 @ 11.75 K cycles/radian. In an attempt to gain confidence in our extrapolation methodology the following PFM data was used.

In January 1981 PFM measurements were made during IA01 and IA02 in an attempt to understand the "measured low MTF values". The results of the associated analyses will be listed and their composite values compared with measured system level PFM MTF performance. All values are for a spatial frequency of 11.75 K cycles/radian.

Table 1. FM Flight Model (FM-1) Computed Single Pass Function of Spatial Frequency vs MTF.

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	Y Axis		X Axis		
	f_{SP} K Cycles/Rad	MTF	f_{SP} K Cycles/Rad	MTF	Comments
TP32015-612	11.28	0.889	11.33	0.882	
25 Jan 82	11.75	0.881	11.75	0.874	Telescope/Mainframe
22:57:12 (Y Axis)	15.23	0.822	15.29	0.806	interface bolts
22:57:12 (X Axis)	23.05	0.681	23.13	0.650	torqued
Z = 0.0000 inch	29.46	0.564	29.55	0.523	
On Axis	39.36	0.383	39.41	0.357	
TP32015-612	11.15	0.902	11.34	0.881	
26 Jan 82	11.75	0.893	11.75	0.873	Telescope/Mainframe
05:10:01 (Y Axis)	15.11	0.843	15.29	0.807	interface bolts
06:30:52 (X Axis)	22.91	0.719	23.12	0.651	torqued
Z = 0.0000 inch	29.32	0.614	29.54	0.524	
On Axis	39.18	0.457	39.42	0.351	
TP32015-612	11.23	0.895	11.15	0.902	
26 Jan 82	11.75	0.887	11.75	0.893	Telescope/Mainframe
22:58:09 (Y Axis)	15.18	0.831	15.13	0.840	interface bolts
22:58:09 (X Axis)	22.98	0.701	22.98	0.701	torqued
Z = -0.010 inch	29.38	0.594	29.41	0.586	
On Axis	39.27	0.425	39.28	0.420	
TP32015-612	11.12	0.905	11.17	0.900	
27 Jan 82	11.75	0.895	11.75	0.890	Telescope/Mainframe
01:30:16 (Y Axis)	15.12	0.841	15.16	0.834	interface bolts
01:30:16 (X Axis)	23.01	0.694	23.03	0.688	torqued
Z = -0.010	29.45	0.571	29.46	0.567	
On Axis	39.33	0.397	39.35	0.388	
STR # F1-002	10.99	0.914	10.95	0.916	
30 Jan 82	11.75	0.904	11.750	0.905	Telescope/Mainframe
18:51:39 (Y Axis)	14.96	0.861	14.95	0.862	interface bolts
18:51:39 (X Axis)	22.76	0.749	22.81	0.741	"loose"
Z = 0.000	29.16	0.655	29.24	0.635	
On Axis	39.03	0.504	39.11	0.481	
STR # F1-002	11.21	0.897	11.39	0.873	Telescope rotated =
31 Jan 82	11.75	0.889	11.75	0.886	1/3 deg CCW as viewed
00:45:11 (Y Axis)	15.15	0.836	15.34	0.792	from behind primary
00:45:11 (X Axis)	22.96	0.708	23.19	0.619	mirror Telescope/
Z = 0.005 inch	29.37	0.599	29.61	0.485	Mainframe interface
On Axis	39.25	0.431	39.47	0.321	bolts torqued. See AHRS Suppl #3 to 51337. Suppl. dated 1/28/82
STR # F1-002	10.88	0.920	10.84	0.922	Telescope rotated =
1 Feb 82	11.75	0.910	11.75	0.911	1/3 CW back to ori-
11:46:54 (Y Axis)	14.83	0.871	14.83	0.873	ginal position
11:46:54 (X Axis)	22.55	0.780	22.66	0.766	Telescope/Mainframe
Z = 0.000 inch	28.85	0.705	29.02	0.680	interface bolts torque
On Axis	38.56	0.596	38.80	0.554	& then 12 loosened.
STR # F1-002	10.84	0.922	10.70	0.923	Same as previous
1 Feb 82	11.75	0.910	11.75	0.915	configuration except
14:24:47 (Y Axis)	14.85	0.871	14.69	0.883	that only 10 bolts
14:24:47 (X Axis)	22.75	0.757	22.47	0.799	are loosened
Z = -0.010	29.15	0.657	28.84	0.708	
On Axis	39.5	0.497	38.63	0.585	

Table 1. TM Flight Model (FM-1) Computed Single Pass Function of Spatial Frequency vs MTF - continued.

F55

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	Y Axis		X Axis		
	f_{SP} K Cycles/Rad	MTF	f_{SP} K Cycles/Rad	MTF	Comments
STR # F1-002	10.53	0.934	10.99	0.914	10 bolts loosene
1 Feb 82	11.75	0.921	11.75	0.904	
16:45:58 (Y Axis)	14.51	0.893	14.97	0.860	
16:45:58 (X Axis)	22.29	0.806	22.30	0.743	
Z = -0.005	28.54	0.742	29.17	0.651	
On Axis	38.11	0.650	38.94	0.524	81 pt. KER
STR # F1-002	11.13	0.904	11.05	0.910	Telescope/Mainfram
2 Feb 82	11.75	0.895	11.75	0.900	interface bolts
10:51:35 (Y Axis)	15.09	0.845	15.05	0.850	retorqued
10:51:35 (X Axis)	22.93	0.715	22.93	0.715	"
Z = -0.005 inch	29.36	0.600	29.36	0.601	KER 41 pts
On Axis	39.27	0.423	39.23	0.438	δX = δY = 0.0002
STR # F1-002	11.10	0.906	11.26	0.891	Telescope/Mainfra
2 Feb 82	11.75	0.897	11.75	0.882	interface bolts
15:34:26 (Y Axis)	15.06	0.849	15.23	0.821	torqued
15:34:26 (X Axis)	22.87	0.728	23.07	0.672	
Z = -0.004 inch	29.19	0.621	29.49	0.552	KER - 81 pts
Z = -0.004 inch	39.19	0.453	39.35	0.390	δX = δY = 0.001 i
STR # F1-002	11.10	0.906	11.09	0.907	Telescope/Mainfra
2 Feb 82	11.75	0.897	11.75	0.897	interface bolts
17:08:50 (Y Axis)	15.06	0.849	15.07	0.848	torqued
17:08:50 (X Axis)	22.89	0.724	22.91	0.719	
Z = -0.010 inch	29.42	0.613	29.33	0.610	KER - 81 pts
+4 mr.Field Angle			39.22	0.445	δX = δY = 0.0001
STR # F1-002	11.31	0.885	11.36	0.878	Telescope/Mainfra
2 Feb 82	11.75	0.877	11.75	0.870	interface bolts
18:14:55 (Y Axis)	15.25	0.817	15.31	0.801	torqued
18:14:55 (X Axis)	23.05	0.600	23.16	0.635	
Z = -0.010 inch	29.44	0.574	29.58	0.505	KER 81 pts
-4 mr.Field Angle	39.28	0.421	39.44	0.338	δX = δY = 0.0001 i

Computed Single Pass Function of Spatial Frequency vs MTF - continued.

F552

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	Y Axis		X Axis		
	f_{SP} X Cycles / Rad	MTF	f_{SP} X Cycles / Rad	MTF	Comments
STR # F1-002	10.53	0.934	10.99	0.914	10 bolts loosened
1 Feb 82	11.75	0.921	11.75	0.904	
16:45:58 (Y Axis)	14.51	0.893	14.97	0.860	
16:45:58 (X Axis)	22.29	0.806	22.30	0.743	
Z = -0.005	28.54	0.742	29.17	0.651	
On Axis	38.11	0.650	38.94	0.524	81 pt. KER
STR # F1-002	11.13	0.904	11.05	0.910	Telescope/Mainframe
2 Feb 82	11.75	0.895	11.75	0.900	interface bolts
10:51:35 (Y Axis)	15.09	0.845	15.05	0.850	retorqued
10:51:35 (X Axis)	22.93	0.715	22.93	0.715	
Z = -0.005 inch	29.36	0.600	29.36	0.601	KER 41 pts
On Axis	39.27	0.423	39.23	0.438	δX = δY = 0.0002 inc
STR # F1-002	11.10	0.906	11.26	0.891	Telescope/Mainframe
2 Feb 82	11.75	0.897	11.75	0.882	interface bolts
15:34:26 (Y Axis)	15.06	0.849	15.23	0.821	torqued
15:34:26 (X Axis)	22.87	0.728	23.07	0.672	
Z = -0.004 inch	23.19	0.621	29.49	0.552	KER - 81 pts
Z = -0.004 inch	39.19	0.453	39.35	0.390	δX = δY = 0.001 inch
STR # F1-002	11.10	0.906	11.09	0.907	Telescope/Mainframe
2 Feb 82	11.75	0.897	11.75	0.897	interface bolts
17:08:50 (Y Axis)	15.06	0.849	15.07	0.848	torqued
17:08:50 (X Axis)	22.89	0.724	22.91	0.719	
Z = -0.010 inch	29.12	0.613	29.33	0.610	KER - 81 pts
+4 mr.Field Angle			39.22	0.445	δX = δY = 0.0001 inch
STR # F1-002	11.11	0.885	11.36	0.878	Telescope/Mainframe
2 Feb 82	11.75	0.877	11.75	0.870	interface bolts
18:14:55 (Y Axis)	15.25	0.817	15.31	0.801	torqued
18:14:55 (X Axis)	23.05	0.600	23.16	0.635	
Z = -0.010 inch	29.44	0.574	29.58	0.505	KER 81 pts
-4 mr.Field Angle	39.28	0.421	39.44	0.338	δX = δY = 0.0001 inch

F552

Table II. Protoflight Model (PFM) MTF Components @ 11.75 K Cycles/

#	Component	MTF	Location of Referenced Da Technical Journal
1	Telescope	0.94	TM XXX1 (K1588) pg.
2	AOS Induced Degradation	0.94 to 0.99	TM XXX1 (K1588) pg. 10
3	SMA	0.90 to 0.98	TM XXX1 (K1588) pg. 99
4	Electrical Filtering	0.70	
5	IGFOV	0.63	

The total MTF is obtained by

$$MTF_T = MTF_1 \times MTF_2 \times MTF_3 \times MTF_4 \times MTF_5 \quad (3)$$

and an approximation for SWR is given by

$$SWR_T = (4/\pi)\, MTF_T \quad (4)$$

Table III is a tabulation of the results.

Table III. Composite MTF and Extrapolated SWR

	MTF_T	SWR_T
Minimum Value	0.325	0.413
Maximum Value	0.351	0.447

Table IV is a tabulation of PFM SWR measured in T/V tests during September 1981. A more complete set of values is given in HS236-7680

Table IV. PFM T/V SWR Measured Performanced

	SWR (15 September 1981)		
	Channel		
Band	High	Low	Average
1	0.471	0.434	0.456
2	0.463	0.410	0.438
3	0.432	0.389	0.407
4	0.455	0.398	0.433
5	0.439	0.394	0.416
7	0.447	0.464	0.435

The correlation between predicted SWR (Table III) and measured SWR (Table IV) is better than I had expected due to the approximation methods used to obtain the predicted values. Nevertheless, it gives a degree of credence to the analytical approximations used.

F552

Using some of the same approximation methods the FM-1 system performance is predicted by

$$SWR_{FM1} = SWR_{PFM} \, (MTF_{FM1}/MTF_{PFM})_{Telescope} \qquad (5)$$

where

$$0.88 \leq MTF_{FM1}(telescope) \leq 0.90$$

using the smaller value of 0.88, Table V is generated.

Table V. Predicted FM1 System Level SWR Performance Based Upon FM1 and PFM Telescope MTF Differences and PFM (September 1981) SWR Performance.

Band	Predicted FM1 SWR (0.88/0.94) SWR_{PFM}
1	0.427
2	0.419
3	0.381
4	0.405
5	0.389
7	0.407

Data Location

Test information is located in TM System Test Log Book F1. Data was recorded on history tape per Table VI.

Table VI. History Tapes - Recorded Data

Time (1982)	History Tape #
1/25	D 03000
1/26-1/27	D 03002
1/29-2/1	D 03003
2/1 -2/2	D 03004
2/2 -2/3	D 03005

Additional information on the test is available in HS236-7837, 2221-503, TM F1 EFL/MTF Test Report.

F552

Summary of MTF Performance for FMI Telescope

Conclusion

As seen above the FMI predicted SWR system performance meets the TM specification of SWR ± 0.35 at 11,750 cycles/radian with margin. It has been noted that our analytical methods are not exact. However, there was good correlation between predicted values and actual measured PFM SWR (September 1981) performance. As an aside there is no question of the adequacy of FMI cross scan (X axis) SWR performance. Since there is no appreciable electrical filtering component in this direction, the system cross scan SWR should be > 0.50.

Thus it is recommended that failure report F0552 be closed based upon the data and conclusions presented above.

J. B. Young

James B. Young

dm

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FAILURE REPORT

F 0591

ORIGINATOR

1. PROGRAM NAME AND NUMBER: THERMATIC WRAPPORT PL 1162 | 2. QLA | 3. MODEL: FLT | 4. TIME OBSERVED | 5. DATE OBSERVED: MO 11 DA 2 YR 79

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☐ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☒ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANFACTUER
7. SUBSYSTEM				
8. UNIT				
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER	Witness Sample For Teles Coating	50825	3	Denton

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ QUALIFICATION ☐ INTEGRATION ☐ LAUNCH OPERATIONS ☐ IN-PROGRESS ☒ ACCEPTANCE ☐ SYSTEM ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☐ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☒ OTHER

14. DESCRIPTION OF FAILURE: Coating Witness Samples Failed Scotch Tape Test After 2nd Humidity Test At SBRC.

15. TEST PROCEDURE: Rac Insp Proc | PARA | 16. ORIGINATOR: R Cline | ORG 122-21 | DATE 11-7-79 | ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS

18. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE

Out of 8 coating witness samples tested 3 showed minor adhesion failure which are attributable to insufficient cleaning.

21. AUTHORIZATION | ORG | DATE | ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: Scrap Coupons

24. QA REVIEWED

25. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: 1) Inspection/Test Instruction and Report used for Source Changed to impose inspection of parts and witness samples, prior to coating; 2) For Contamination 2) PWS 50825 Note 10 Changed Humidity Requirements From; 24 Hours at 50°C with 95% Relative Humidity To; 24 Hours at From 45 to 50°C with 90 to 95% Relative Humidity.

33. FRB CLOSURE | ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: Rev. D of Drawing 50825. Effectivity S/N 002 & Subs

34. BASIC CAUSE OF VERIFIED FAILURE: ☒ DESIGN ☐ TEST EQUIP. ☐ MFG. PROCEDURE ☐ WIRING ERROR ☒ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☒ PRIMARY ☐ UNKNOWN ☐ INDUCED ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☒ MINOR ☐ MAJOR ☐ SAFETY

37. RESPONSIBLE ENGINEER | ORG 122-21 | DATE 11-14-79

38. SPACECRAFT SYSTEM ENGR. | ORG 122-61 | DATE 11/10/79

39. RELIABILITY | ORG 57-41 | DATE 11/20/79

40. CUSTOMER OR SUPPLIER | DATE 11/21/79

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SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

F0591
FR SERIAL NO.

CONT. SHEET LETTER*

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

ADDITIONAL FR CONTINUATION SHEET(S) USED

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

30	Witness samples failed when tested to drawing 50825 Rev. C. Rev. C of drawing 50825 required the witness samples to be tested at 50°C and 95% relative humidity. There were no tolerances for temperature or humidity specified on Rev. C of drawing 50825. Therefore, the witness samples were tested above design limits. Witness samples from the same lot were tested to Rev. D of drawing 50825 and passed.
	[signature] 10/21/81

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COPY 1 ROUTE WITH DISCREPANT ITEM

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FAILURE REPORT

F 1742

ORIGINATOR

1. PROGRAM NAME AND NUMBER: PL1162 (TM) | 2. GLA | 3. MODEL: PFFT | 4. TIME OBSERVED | 5. DATE OBSERVED: MO 8 DA 6 YR 79

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SUBSYSTEM ☒ ASSEMBLY ☐ MODULE ☐ CARD ☐ SYSTEM ☐ UNIT ☐ SUBASSEMBLY ☐ MICAM ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM			10/29/81	
8. UNIT			F1	
9. ☒ ASSEMBLY ☐ SUBASSEMBLY	Telescope Assy	51332	PFT003	SBRC
10. ☐ MODULE ☐ MICAM ☐ CARD	Primary Mirror	50822	001	Speedring
11. OTHER		Rtw		

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS Assembly ☐ QUALIFICATION ☐ ACCEPTANCE ☒ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ RADIATION ☐ TEMPERATURE ____ ° ____ ☐ THERMAL VAC ____ HRS. AT ____ ° ____ . ☐ EMC/RFI ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: Discoloration (reddish hue) observed on mirror surface

15. TEST PROCEDURE | PARA | 16. ORIGINATOR: A. Davis | ORG | DATE: 1/17/80 | 17. ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18. VARIFICATION AND FAILURE ANALYSIS: Note: FR was written in error and part was sent to MRB for disposition. Refer to NCMR 280985. (Copy attached).

18. FAILED ITEM NAME AND PART NUMBER

20. ☐ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE

21. AUTHORIZATION | ORG | DATE | 22. ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN | 24. QA REWORK | 25. QA RETEST

26. LIST ALL PARTS REPLACED

PART NUMBER	CKT SYM	PART LOT NO.	DATE CODE	MFR	PROBABLE DEFECT	ANALYSIS NO.

27. REWORK BY | ORG | DATE | 28. RETESTED BY | ORG | DATE | 29. ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: Note: Subject FR was written in error. The anomaly observed should not have been written on a Failure Report, instead it should have been recorded on a Non-Conforming Material Report (NCMR) and submitted for Material Review Action. This error had been corrected by the initiation of NCMR No. 280985 and submission of subject hardware for Material Review Action. This Failure Report is cancelled as of 10/29/81. Note: Part was dispositioned "use as is" by Material Review | 31. ☐ CONTINUATION SHEET USED

33. FRB CLOSURE: 10/30/81

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ TEST EQUIP ☐ MFG. PROCEDURE ☐ WIRING ERROR ☐ UNKNOWN ☐ ENVIRONMENTAL ☐ TEST PROC. ☐ ASSY/FAB ERROR ☐ ROUGH HANDLING ☐ DEFECTIVE PARTS ☐ TEST SET-UP ☐ WORKMANSHIP ☐ WEAR-OUT | DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE | 36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER: ORG 22-25 DATE 10-29-81 | 38. SPACECRAFT SYSTEM ENGR: ORG 2261 DATE 811030

39. RELIABILITY: ORG 51-41 DATE 10-29-81 | 40. CUSTOMER OR SUPPLIER: DATE 11/16/81

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SPACE AND COMMUNICATION GROUP
EQUIPMENT CHECKOUT
FAILURE REPORT
CONTINUATION SHEET

F1742
FR SERIAL NO.

CONT. SHE
LETTER*

*LABEL FIRST CONTINUATION SHEET USED 'A', SECOND 'B', AND SO ON

IDENTIFY ENTRIES BY REFERENCING FR BLOCK NUMBER IN COLUMN, DATE EACH ENTRY.

ADDITIONAL F
CONTINUATIO
SHEET(S) USED

30	Board authority. A copy of NCMR 280985 is attached.

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COPY 1 ROUTE WITH DISCREPANT ITEM

NONCONFORMING MATERIAL REPORT (NCMR)

NO. 051902
DATE 1-
PAGE 1 OF

PROGRAM ID TECHNICAL MIRROR V013 HPRG X-(F)

P/O	S/N	ENG. CHANGES	NOMENCLATURE
50805-B	001		TELESCOPE SYSTEM

ORDER DOC NO.	LOT SIZE	QTY. SUSP.	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
	1	1	STORE		10072

VENDOR	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO.	ITEM NO.	I.R. NO.
PERKIN ELMER CORP.	DANBURY CONN.		51595-1-	7	

QTY REJ.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	1	HEMISPHERICAL REFLECTED SCATTERED COMPONENT SHALL		0	YES	B
		NOT BE GREATER THAN 0.20%. REF SPEC 10072 PAR 3.2.2.				
		PRIMARY OPTICS ROUGH IS .30 TO .40%				
		SECONDARY MIRROR IS .50 TO .60%				
1	1	PAR 3.3.1 REFLECTIVITY S/B AT LEAST 0.91 IS .957		0	YES	B
		(SEE ATTACHED SHEET)				

INSPECTOR DATE QUALITY M. Samuels DATE 1-3-79 ENGINEERING [illegible] DATE 1-3-79

DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
B	USE AS IS. SUBMIT FORMAL REQUEST FOR WAIVER TO NASA.	
	THE MASTER DOCUMENT RAW DATA BE RETENTIVE	
	OAK LANDING DOCUMENT IMPART BE RETENTIVE AS SIMILAR	
	TO NORET.	
	WAIVER # SB-W014	
	Proceed at your own risk, Eng A 4/4/79 (HO)	
	pending approval of waiver and object to shr	

INSPECTOR DATE 1-3-79 QUALITY M. Samuels DATE 1-3-79 CUSTOMER DATE

CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION	CORRECTIVE ACTION
SURFACE ROUGHNESS		NONE. THE COATING VENDOR WAS DIRECTED
		TO PROCEED ON A BEST EFFORT BASIS
OPTICAL QUALITY		WITH SPEC REQUIREMENTS AS A DESIGN
		GOAL.

INSPECTOR M. Samuels DATE 1-3-79 SIGNATURE M. Samuels DATE 1-3-79

RESPONSIBILITY		DEBIT VENDOR		DISP.CODE	VENDOR PACKING SHEET	QTY. R.T.V.	QTY. SCRAP	BUYER'S SIGNATURE	DATE	COPY
GOV.	MAC	YES	NO					Gregory Loya	4/4/79	
☐	☐	☐	☐							

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EL SEGUNDO, CALIFORNIA

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FAILURE REPORT

808

S

ORIGINATOR

1. PROGRAM NAME AND NUMBER	2. GLA	3. MODEL	4. TIME OBSERVED	5. DATE OBSERVED
T.M		FL	23:40	MO 11 DA 8 YR 8

6. HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☒ SUBSYSTEM ☐ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION:	NAME	PART NUMBER	S/N	MANUFACTURER
7. SUBSYSTEM	TELESCOPE ASSY	51337 A	002	SORC
8. UNIT	PRIMARY MIRROR	50822	001	
9. ☐ ASSEMBLY ☐ SUBASSEMBLY				
10. ☐ MODULE ☐ MICAM ☐ CARD				
11. OTHER				

12. TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☒ IN-PROCESS ☐ QUALIFICATION ☐ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13. ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☒ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ☐ TEMP ____ ° ____ ☐ THERMAL VAC ____ HRS AT ____ ° ____ AXIS FOR ____ MIN TYPE ____ ☐ OTHER

14. DESCRIPTION OF FAILURE: WHILE MOUNTING THE REGISTRATION SURFACE REF PLATE TO THE PRIMA MIRROR SECTION OF THE I.D. OF THE MIRROR BROKE AND POPPED THE REF PLATE OUT OF ITS HOLD.

15. TEST PROCEDURE	PARA	16. ORIGINATOR	ORG	DATE	17. CONTINUAT ☐ SHEET USE
TP 32015-612	4.7.1.1.4	J. WALKER	27-21	11-8-80	

ENGINEERING EVALUATION

18. VERIFICATION AND FAILURE ANALYSIS: VISUAL ANALYSIS SHOWS BREAKAGE. SYTEM TEST LOG BOOK PF-1 PAGES 42 & 43 SHOWS EXTENT OF BREAKAGE

19. FAILED ITEM NAME AND PART NUMBER: 50822

20. ☒ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK/RETEST NOT REQUIRED BECAUSE

REWORK & PENALTY TEST PER NRCO 299608 AND WAIVER W-095

21. AUTHORIZATION	ORG	DATE	22. CONTINUAT ☐ SHEET USE
	22-35	11-18-81	

MANUFACTURING AND TEST

23. REWORK/RETEST ACTION TAKEN: SEE ATTACHED NRCO 299608 AND MRCO HS 236-7723

24. QA REWORK: 179

25. QA RETEST

26. LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NU

27. REWORK BY	ORG	DATE	28. RETESTED BY	ORG	DATE	29. CONTINUA ☐ SHEET USE

ENGINEERING/RELIABILITY

30. CAUSE AND CORRECTIVE ACTION: ALL TOOLING THAT CLAMPS TO PRIMARY MIRROR HAS BEEN SCRAPED AND NEW TOOLING HAS BEEN FABRICATED AND IS IN USE THAT DOES NOT CLAMP TO PRI MIRROR.

CAUSE AND CORRECTIVE ACTION NCMR # 299608, AND IDC HS 236-7723 DATED 11-16-81 (ATTACHED)

31. FRB CLOSURE: 11/19/81

31. ☐ CONTINUATION SHEET USED

32. DOCUMENT IMPLEMENTING CORRECTIVE ACTION: NCMR #299608 (ATTACHED)

34. BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☒ TEST EQUIPMENT ☐ TEST PROCEDURE ☐ TEST SET-UP ☐ MFG. PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR-OUT ☐ UNKNOWN — DEFECT CODE

35. FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE

36. FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☐ MINOR ☐ SAFETY

37. RESPONSIBLE ENGINEER	ORG	DATE	38. SPACECRAFT SYSTEM ENGINEER	ORG	DATE
	22-35	11-18-81		22-41	11/19/81
39. RELIABILITY	ORG	DATE	40. CUSTOMER OR SUPPLIER		DATE
	51-41	11-19-81			

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11/30/81

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NONCONFORMING MATERIAL REPORT (NCMR)

114612

NO. 299608

DATE 11-8-80

PAGE 1 OF 1

PROGRAM ID T.M. V013 7 PRB

PART NO.	S/N	ENG. CHANGES	NOMENCLATURE
51337 REV. 'A'	PROTOFLIGHT 002		TELESCOPE ASSY

WRK ORDER DOC NO.	LOT SIZE	QTY. SUSP.	SUSPENDED IN	HARDWARE I.D. NO.	REF. DOCUMENTS
	1	1	760 CLEAN ROOM		AHR SUPPL No. 9 / F.R.# 55084

SUPPLIER	DIV. OR LOCATION	SUPPLIER CODE	P.O. NO.	ITEM NO.	R.R. NO.

ITEM	QTY INSP.	QTY SUSP.	DESCRIPTION OF NONCONFORMANCE	RESP. DEPT.	PRIOR OCCUR	M.R. LEVEL	CODE
1	1	1	APPROXIMATELY 50% OF THE LIP OF THE I.D. OF THE PRIMARY MIRROR (P/N 50822, S/N 001) WAS BRIGEN-OUT		-0-	MRB	E

ORIGINATOR S.H. Brandt DATE 11-8-80 | QUALITY S.H. Brandt DATE 11-8-80 | ENGINEERING [signature] DATE 11-10-80

ITEM NO.	DISP. CODE	DISPOSITION/INSTRUCTIONS	STAMP
1	E	REPAIR AND REQUALIFY PER MRCO	

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NOT MINOR DISCREPANCIA.
⊗ DISPOSITION REJECTED.
REPAIR REQUIRES WAIVER/DEVIATION. [signature] 4/16/81

ENGINEERING [signature] DATE 4-2-81 | QUALITY [signature] DATE 4-16-81 | ⊗ CUSTOMER DATE

ITEM NO.	CAUSE OF NONCONFORMANCE	RESULTS OF CORRECTIVE ACTION INVESTIGATION	CORRECTIVE ACTION
1	FIXTURE DID NOT INTERFACE PROPERLY WITH THE MIRROR CAUSING HIGH STRESSES AND RESULTANT FAILURE.		ALL FIXTURES THAT CLAMP ON THE MIRROR HAVE BEEN SCRAPED AND REMADE WITH NEW TOOLING.

SIGNATURE [signature] DATE 4-16-81 [signature]

RESPONSIBILITY | DEBIT VENDOR | DISP. CODE | VENDOR PACKING SLIP

END

DATE

FILMED

AUG 5 1983